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A

HISTORY

OF

INVENTIONS AND DISCOVERIES.

BY JOHN BECKMANN,

Public Profeſſor of Economy in the Univerſity of Gottingen.

TRANSLATED FROM THE GERMAN,

BY WILLIAM JOHNSTON.

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BRITISH MUSEUM

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ERRATA.

VOL. II.

P. 2, note firſt, l. 6, *for* ſhell of the ſea-hare, *read* ſhield of the ſea-hare.
P. 22, l. 6 from the bottom, *for* Iſiodorus, *read* Iſidorus.
P. 33, l. 4, *for* ſhores, *read* ſewers.
P. 62, l. 10 from the bottom, *for* John Rentmann, *read* John Kentmann.
P. 69, laſt line, *for* king of Lybia, *read* king of Lebæa.
P. 117, l. 2 from the bottom, *for* kind of cork, *read* kind of oak.
P. 367. l. 6 and 7 from the bottom, *dele* in the beginning of the ſixteenth century.

HISTORY

OF

INVENTIONS.

ARTIFICIAL PEARLS.

THOSE round calcareous * excreſcences found both in the bodies and ſhells of ſeveral kinds of ſhell-

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* It was becauſe pearls are calcareous that Cleopatra was able to diſſolve hers in vinegar, and by theſe means to gain a bet from her lover, as we are told by Pliny, lib. ix. cap. 35, and Macrobius, Saturn. lib. ii. cap. 13. She muſt, however, have employed ſtronger vinegar than that which we uſe for our tables, as the pearls, on account of their hardneſs and their natural enamel, cannot be eaſily diſſolved by a weak acid. Nature has ſecured the teeth of animals againſt the effects of acids, by an enamel covering of the like kind; but if this enamel happen to be injured only in one ſmall place, the teeth ſoon ſpoil and rot. Cleopatra perhaps broke and pounded the pearls; and it is probable that ſhe afterwards diluted the vinegar with water, that ſhe might be able to drink it; though diſſolved calx deſtroys acids and renders them

ſhell-fiſh *, have been uſed as ornaments ſince the earlieſt ages †. Their elegant blueiſh luſtre, occaſioned by the enamel with which they are covered, hath raiſed them to a high value; and this they have always retained on account of their ſcarcity and the expence ariſing from the laborious manner in which they are collected. By the increaſe of luxury among the European nations, the uſe of pearls has become more common; and in Pliny's time they were worn by the wives of the inferior public officers, in order that they might vie in the coſtlineſs of their dreſs with ladies of the firſt rank. It is probable, therefore, that methods were early invented to occaſion or haſten the formation

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them imperceptible to the tongue. We are told that the diſſipated Clodius gave to each of his gueſts a pearl diſſolved in vinegar to drink: *ut experiretur in gloria palati*, ſays Pliny, *quid ſaperent margaritæ; atque ut mire placuere, ne ſolus hoc ſciret, ſingulos uniones convivis abſorbendos dedit.* Horace, lib. ii. ſat. 3, ſays the ſame. Caligula, alſo, *margaritas pretioſiſſimas aceto liquefactas ſorbebat. Suet.* cap. 37. That pearls are ſoluble in vinegar is remarked in Pauſanias, b. viii. ch. 18, and Vitruvius, b. viii. ch. 3.

* That pearls are not peculiar to one kind of ſhell-fiſh, as many believe, was known to Pliny, who ſays, *quo apparet, non uno conchæ genere naſci.* I have a number of very good pearls which were found by my brother in Colcheſter oyſters. It is more worthy of remark, and leſs known, that real pearls are found under the ſhell of the ſea-hare *(Aplyſia)*, as has been obſerved by Bohadſch in his book *De animalibus marinis*, Dreſdæ 1761, 4to. p. 39.

† In the time of Job pearls were accounted to be of great value. *Job*, chap. xxviii. v. 18.

mation of pearls: and as at preſent thoſe who cannot afford to purchaſe gold, jewels and porcelain, uſe in their ſtead pinchbeck, artificial gems and ſtone-ware; ſo methods were fallen upon to make artificial pearls.

The art of forcing ſhell-fiſh to produce pearls was known, in the firſt centuries of the Chriſtian æra, to the inhabitants of the coaſts of the Red-ſea, as we are told by the philoſopher Apollonius, who thought that circumſtance worthy of particular notice. The Indians dived into the ſea, after they had rendered it calm, and perhaps clearer, by pouring oil into it. They then enticed the fiſh by means of ſome bait to open their ſhells; and having pricked them with a ſharp-pointed inſtrument, received the liquor that flowed from them in ſmall holes made in an iron veſſel, in which they hardened into real pearls *. Olearius ſays, that this

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* *Philoſtrat. in Vita Apollon.* lib. iii. cap. 57. edit. Olearii, p. 139. I ſhall here give the tranſlation of the paſſage, as amended by Conrade Geſner in his *Hiſt. nat.* lib. iv. p. 634, becauſe it is more correct than that of Olearius. Dignum exiſtimavi quæ de altero margaritarum genere (arte facto ſcilicet) traduntur non prætermittere, quandoquidem nec ipſi Apollonio res viſa eſt levis, ſed auditu jucunda, et mirabilium omnium mirabiliſſima. Nam, qua parte inſula pelagus reſpicit, immenſa eſt maris altitudo; fert autem oſtreum in teſta alba, quadam pinguedine referta. Lapidem autem nullum producit. Inde maris tranquillitatem obſervant, et aquæ ſuperficiem etiam ipſi olei infuſione levigant. Tum ad oſtrea capienda ingreditur

this account is to be found in no other author: but it has at leaſt been copied by Tzetzes, whoſe words may in ſome meaſure ſerve as an explanation *.

We are as yet too little acquainted with ſhell-fiſh to be able to determine with certainty, how much truth there really may be in this relation: but we have great reaſon to conjecture from it that the people who lived on the borders of the Red-ſea were

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tur aliquis, ita inſtructus paratuſque ſicut qui ſpongias colligunt. Eſt autem ei ferreus later (σπλινθις σιδηρα) et alabaſtrum unguenti; atque ita prope oſtrea conſidens Indus unguento quaſi eſca ad fallendum utitur. Namque illo perfuſa oſtrea ſeſe aperientia inebriantur. Tunc ferreo ſtylo (κεντρῳ) perforata quaſi ſaniem quandam emittunt. Hanc venator ferreo latere (πλινθιδι) excipit, qui in varias multipliceſque formas concavatus eſt. Ea vero poſtmodum ſanies lapideſcit, atque in modum naturalis margaritæ albus ille ſanguis obdureſcit. Et hæc eſt quæ ex Rubro Mari colligitur margarita. Huic autem venationis generi etiam Arabes intendunt, ex oppoſito maris habitantes.—But what is *ferreus later?* Geſner quotes from Giſb. Longolius' edition of Philoſtratus the following explanation, which Olearius ought not to have omitted: πλινθις σιδηρα, non πλινθας, ut interpres legiſſe videtur. Eſt autem πλινθις, ut quidam dicunt, ſcalpellum quo cæmentarii utuntur ad æquandam et poliendam laterum ſcabriciem, vel, ut alii interpretantur, διοκις, id eſt pugio major et quadratus inſtar trabis. Alii aſſerculum eſſe putant, vel tabulam qua mulieres lanam vellentes utuntur.

* Uniones alios τυπωτους, alios χειροποιητους vocant. Priores ſic fiunt: ingreditur aliquis (mare) cum veru et typario (inſtrumento aut vaſculo) ferreo, idoneo ad ſpeciem rotundam margaritis conciliandam. Hoc proxime concham poſito, oſtreum (carnem animantis) veru pungit; fluit e vulnere ſanies, quæ vaſculi formulis excepta denſataque margarita fit. *Tzetzes variorum*, lib. ii. ſegm. 373.

were then acquainted with a method of forcing ſhell-fiſh to produce pearls; and as the arts in general of the ancient Indians have been preſerved without much variation, the proceſs employed by the Chineſe at preſent, to cauſe a certain kind of muſcles to form pearls, ſeems to confirm the account given by Philoſtratus. In the beginning of ſummer, at the time when the muſcles repair to the ſurface of the water and open their ſhells, five or ſix ſmall beads, made of mother-of-pearl, and ſtrung on a thread, are thrown into each of them. At the end of a year, when the muſcles are drawn up and opened, the beads are found covered with a pearly cruſt, in ſuch a manner that they have a perfect reſemblance to real pearls. The truth of this information cannot be doubted, though ſome experiments made in Bohemia for the ſame purpoſe were not attended with ſucceſs *. It has been confirmed by various perſons †, and it is very probable that ſome operations and ſecrets, without which the proceſs would prove fruitleſs even in

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* See Dr. Joh. Mayer's *Bemerkungen*, in the fourth part of *Abhandlungen einer privatgeſelſchaft in Böhmen*, p. 165.

† Abhandlungen der Schwediſchen akadem. der wiſſenſchaften, vol. xxxiv. p. 89. The author of the paper alluded to had a muſcle with ſuch artificial pearls, which had been brought from China. It was a *mytilus cygneus*, the ſwan-muſcle, or great horſe-muſcle. Mention is made alſo in *Hiſtoire de l'académie des ſciences de Paris*, année 1769, of a ſtone covered with a pearly ſubſtance which was found in a muſcle.

China, may be unknown to the Europeans. Beſides, many obſervations are known which ſeem to ſhew the poſſibility of ſuch an effect being produced. Profeſſor Fabricius ſays, that he ſaw in the poſſeſſion of Sir Joſeph Banks, at London, large *chamæ* *, brought from China, in which there were ſeveral bits of iron wire, incruſted with a ſubſtance of a perfect pearly nature †. Theſe bits of wire, he ſaid, had been ſharp, and it appeared as if the muſcles, to ſecure themſelves againſt the points of the wire, had covered them with this ſubſtance, by which means they had been rendered blunt. May not therefore the proceſs employed by the ancients be ſtill practiſed? And may not theſe bits of wire have been the ſame as thoſe ſpikes uſed by the people in the neighbourhood of the Red-ſea for pricking muſcles, and which perhaps ſlipped from the hands of the Chineſe workmen and remained in the animals?

The invention therefore of Linnæus cannot be called altogether new. That great man informed the king and council in the year 1761, that he had diſcovered an art by which muſcles might be made to produce pearls, and he offered to diſcloſe the method for the benefit of the kingdom. This however was not done, but he diſpoſed of his ſecret to one Bagge, a merchant at Gottemburg, for the ſum of eighteen thouſand copper dollars, which make about five hundred ducats. In the year 1780, the heirs of this merchant wiſhed to ſell to the higheſt bidder the ſealed-up receipt *: but whether the paper was purchaſed, or who bought it, I do not know; for profeſſor Retzius at Lund, of whom I enquired reſpecting it, could not inform me †. In the year 1763, it was ſaid in the German newſpapers, that Linnæus was ennobled on account of this diſcovery, and that he bore a pearl in his coat of arms; but both theſe aſſertions are falſe, though profeſſor Fabricius conjectures that the firſt may be true ‡. Linnæus received his patent of nobility, which, together with his arms, I have ſeen, in the year 1756, conſequently long before he ſaid any thing reſpecting that diſcovery, of which the patent does not make the leaſt mention. What in his arms has been taken for a pearl, is an egg, by which Mr. Tilas, whoſe buſineſs it then was to blazon the arms of ennobled families, meant to repreſent all nature, after the manner of the ancient Egyptians. The arms are divided into three fields, each of which, by the colour which forms

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* A kind of muſcle-ſhells, of which there are a great variety. TRANS.

† J. C. Fabricius Briefe aus London. Deſſau 1784, 8vo. p. 104.

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* See Schlozer's Briefwechſel, number 40. p. 251.

† Dr. Stover, in his Life of Linnæus, vol. i. p. 360, ſays that the manuſcript containing this ſecret is in the poſſeſſion of Dr. J. E. Smith at London. Trans.

‡ In his Letters, p. 104. The ſame account is given in *Schreber's Sammlung zu den ökonomiſchen wiſſenſchaften*, vol. x. p. 353.

the ground, expreſſes one of the kingdoms of nature; the red ſignifying the animal, and the green the vegetable, &c. Over the helmet, by way of creſt, is placed the *linnea* *; that beautiful little moth the *phalæna linneella*, ſhining with its ſilvery colours, is diſplayed around the border inſtead of feſtoons; and below is the following motto, *Famam extendere factis*. Linnæus once ſhewed me, among his collection of ſhells, a ſmall box filled with pearls, and ſaid, *Hos uniones confeci artificio meo; ſunt tantum quinque annorum, et tamen tam magni.* "These pearls I made by my art, and though ſo "large they are only five years old." They were depoſited near the *mya margaritifera*, from which moſt of the Swediſh pearls are procured; and the ſon, who was however not acquainted with his father's ſecret, ſaid the experiments were made only on this kind of muſcle, though Linnæus himſelf aſſured me that they would ſucceed on all kinds.

I conjecture that Linnæus alluded to this art in his writings ſo early as the year 1746, or long before he ever thought of keeping it a ſecret. The paſſage I mean is in the ſixth edition of his *Syſtema naturæ*, where he ſays: *Margarita. Teſtæ excreſcentia latere interiore, dum exterius latus perforatur* *. I once told him that I had diſcovered his ſecret in his own works; but he ſeemed to be diſpleaſed, did not enquire after the paſſage, and changed the diſcourſe. That pearls are produced when the ſhells have been pierced or injured in a certain manner, is highly probable, and has been in modern times often remarked †. It appears alſo, that the animal has the power of ſometimes filling up ſuch openings with a calcareous ſubſtance, which it depoſits in them. This ſubſtance aſſumes the figure of the orifice, and the animal particles it contains give it its brightneſs and luſtre ‡. Pearl-fiſhers have long known that muſcles, the ſhells of which are rough and irregular, or which exhibit marks of violence, commonly contain pearls, though they are found alſo in others in which the ſame appearances are not obſerved ‖. I am perfectly aware that experiments which ſome have made by piercing the ſhells of muſcles, have been unſucceſsful *; but this does not prove that it is impoſſible to procure pearls in that manner. Thoſe who made them did not perhaps pierce the proper part of the ſhell; perhaps they made the orifice ſo large that it weakened the animal; and they may not have choſen the propereſt ſeaſon of the year. The ſtrongeſt objection, however, which can be made on this ſubject, is the undeniable truth that the proper valuable pearls are not found adhering to the ſhell, but in the body only; and that therefore thoſe calcareous balls which fill up holes, cannot be perfect pearls. But from the words of Linnæus above quoted, I am led to conjecture, that he only made a hole in the ſhell without piercing it quite through. Linnæus alſo may have done ſome injury to the animal itſelf when it opened its ſhell; for it is certain that teſtaceous animals are ſtrong-lived, and can eaſily ſuſtain any violence. It appears by the Tranſactions of the Swediſh Academy, that ſome have been of opinion that ſhell-fiſh might be made to produce pearls by a particular kind of nouriſhment; and Liſter † thinks that theſe excreſcences would be more abundant, were the muſcles placed in water impregnated with calcareous matter; but

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* This plant, named after the father of botany, grows in Swiſſerland, Siberia and Canada, but particularly in Norway and Sweden, in ſhady places amidſt the thick woods. The flowers, which appear in June and July, are ſhaped like a bell, white without, red in the inſide, and ſomewhat hairy. They have a pleaſant ſmell, eſpecially in the evening. In Tronhiem and the neighbouring parts they are drunk as tea for medicinal purpoſes. TRANS.

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* Pearl. An excreſcence on the inſide of a ſhell when the outer ſide has been perforated.

† See Chemnitz's theory of the origin of pearls, in the Beſchäftigungen der Berliniſchen Naturforſchenden Geſelſchaft, i. p. 348.

‡ The animal part ſhews itſelf in diſtillation by a volatile alkali, and an oil ſomewhat inflammable. See *Neumanns Chemie*, von Keſſel herauſgegeben, vol. iii. p. 142.

‖ Abhandlungen der Schwed. Akadem. vol. iv. p. 245, and xxi. p. 142.

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* Fabricius, in his Letters, p. 105, mentions ſuch an experiment, which was however continued only for a year.

† Exercitatio anatomica de cochleis. Londini 1694, p. 183.

profeſſor Linnæus ſeems certain that his father employed none of theſe methods.

Under the name of falſe or artificial pearls are underſtood at preſent ſmall beads ſo prepared by art as to approach very near to real pearls in ſhape, luſtre, colour and poliſh. It appears that in Pliny's time ſuch were not known, elſe he certainly would have mentioned them. The invention was not eaſy, and this difficulty to imitate pearls has contributed, with the reaſons before mentioned, to keep up their value. It would ſeem that at firſt hopes were entertained of finding a method to make large pearls from ſmall or broken ones. Tzetzes ſpeaks of this imagined art*, and receipts for that purpoſe have been ſtill retained in various books, where they fill up room and amuſe the ignorant; for it is hardly poſſible to give to the pulveriſed calcareous matter ſufficient hardneſs, and that luſtre which belongs only to the ſurface of real pearls, and which, when theſe are deſtroyed, is irrecoverably loſt. More ingenious was the idea of making pearl-coloured glaſs beads of that kind called *margaritini* †; but it excites no wonder that this was not done earlier, though the art of making coloured glaſs is very old; for opal colours are obtained only by a ſkilful proceſs and the addition of putty, bone-aſhes, and other ſubſtances, with which experiments cannot be ſo eaſily made upon glaſs as with iron. Still earlier was the invention of making hollow glaſs beads, which were incruſted on the inſide with a pearl-coloured varniſh. This method was firſt purſued, as far as I have been able to learn, by ſome artiſts at Murano; but their invention ſeems to have been conſidered by the government as too fraudulent, and was therefore prohibited, as we are told by Franciſcus Maſſarius, who lived in the beginning of the ſixteenth century at Venice, and muſt therefore have had an opportunity of knowing the truth of this circumſtance *. Some ſay that an amalgam of quickſilver was uſed for theſe pearls; and if that was the caſe, the object of the Venetian prohibition was rather of a medicinal nature. After this, ſmall balls of wax or gum were covered with a pearl-coloured enamel. Theſe were praiſed on account of their luſtre; but as their beauty was deſtroyed by moiſture, they did not continue long in uſe †. A French bead-

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* Arte autem ſic parant: e parvis margaritis comminutis alias majores in orbem effingunt. *Tzetzes*, ut ſupra.

† This manner of preparing *margaritini* may be ſeen in my Anleitung zur technologie, p. 307.

maker,

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* Tempore meo Murianenſes vitrearii uniones adulterabant. Primum uniones vitreos vacuos, ſed tranſlucidos faciebant, deinde materia implebant qua ſplendidi et unionum coloris redderentur, in tantum ut vix a veris unionibus diſcerni poſſent. Quapropter fuerunt decemvirorum decreto vetiti. *Fran. Maſſarii, Veneti, in nonum Plinii de naturali hiſtoria librum caſtigationes et annotationes.* Baſileæ 1537, 4to. cap. 35.

† Alios ſpes lucri mentita eſt candidos et nitentes; et ſi qui alii homines non inexpertos fallent, erunt hi. Ex gummi quo-

dam

maker, however, named Jaquin, at length ſound out the manner of preparing the glaſs pearls uſed at preſent, which excell all others, and which approach as near to nature as poſſible, without being too expenſive.

Jaquin once obſerved, at his eſtate near Paſſy, that when thoſe ſmall fiſh called *ables* or *ablettes* were waſhed, the water was filled with fine ſilver-coloured particles. He ſuffered this water therefore to ſtand for ſome time, and obtained from it a ſediment which had the luſtre of the moſt beautiful pearls; and which on that account led him to the attempt of making pearls from it *. He ſcraped off the ſcales of the fiſh, and called the ſoft ſhining powder, which was extended in the water, eſſence of pearl, or *eſſence d'orient* †. At firſt he covered with it ſmall beads made of gypſum, or hardened

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dam genere et miſtura quadam candida coagulant, formantque, ut minus perſentiatur fraus, elenchi plerumque figura. Cum primum tales viderem, aſtu aliquo dolum tentare non occurrebat. Aſtute tamen indagari poſſe exiſtimo, ſi humidis digitis quantum permiſſum eſt contrectentur, ut aliquis gummi lentor, qui fraudem arguat, percipiatur. *Mercati Metallotheca*, p. 211.

* Theſe ſilver-coloured particles were examined by Reaumur, who gave a deſcription of them in *Hiſtoire de l'académie*, année 1716, p. 229. They are found alſo in the ſtomach and inteſtines of thoſe fiſh.

† By the word oriental it appears that the artiſt had in his view eaſtern pearls.

hardened paſte; and, as every thing new, particularly in France, is eagerly ſought after, this invention was greatly admired and commended. The ladies, however, for whoſe uſe it was chiefly intended, ſoon found that it did not entirely anſwer their expectations. They were diſpleaſed becauſe this pearly coat, when expoſed to heat, ſeparated from the beads, adhered to the ſkin, and gave it a brightneſs which they did not wiſh. They propoſed themſelves, that ſmall hollow glaſs beads might be covered, in the inſide, in the ſame manner as mirrors are ſilvered, with the eſſence of pearl; and thus was brought to perfection an art of which the following account will enable the reader to form ſome idea.

Of a kind of glaſs eaſy to be melted, and made ſometimes a little blueiſh or dark, ſlender tubes are prepared, which are called *giraſols* *. From theſe the artiſt blows, by means of a lamp, as many ſmall hollow globules as he may have occaſion for. One workman can in a day blow ſix thouſand; but when they are required to be extremely beautiful, only twelve or fifteen hundred; and that they may have a greater reſemblance to nature, he gives them ſometimes blemiſhes, like thoſe generally obſerved in real pearls. They are made of all figures; ſome ſhaped like a pear, others like an olive, and ſome that may be conſidered as *coques de perles**. To overlay theſe thin glaſs bubbles he mixes the pearl eſſence with melted iſinglaſs; and the more of the former he uſes, theſe pearls become the more beautiful and more valuable. This varniſh, when heated, he blows into each globule with a fine glaſs pipe, and ſpreads it over the whole internal ſurface, by ſhaking the pearls thus prepared in a veſſel placed over the table where he is at work, and which he puts in motion by his foot, until the varniſh is equally diffuſed all over the inſide of them, and becomes dry. Sometimes he adds to the eſſence ſome red, yellow, or blue colour; but as this is a deviation from nature, it is not accounted a beauty. To give theſe tender glaſs globules more firmneſs and ſtrength, they are filled with white wax. They are then bored through with a needle, and threaded in ſtrings for ſale. The holes in the finer ſort, however, are firſt lined with thin paper, that the thread may not adhere to the wax*.

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* *Giraſol.* This word, which is wanting in moſt dictionaries, ſignifies opal, and ſometimes that ſtone called cat's-eye, *ſilex catophthalinus*, *pſeudopalus*, &c. *Couleur de giraſol* is applied to ſemi-tranſparent milk-white porcelain.

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* *Coques de perles* are flat on one ſide, and are uſed for ornaments, one ſide of which only is ſeen. By Pliny they are called *phyſemata*. Artificial pearls of this kind have, for ſome time paſt, been employed in making ear-rings. Our toymen, after the French, give theſe pearls the name of *perles coques*; but the following account of Pouget in *Traité des pierres précieuſes et de la manière de les employer en parure*, Paris 1762, 2 vol. quarto, i. p. 20, makes me dubious reſpecting them. "*La coque perle*," ſays he, "is not formed in a pearl-ſhell like the pearl; it is procured from a kind of ſnail found only in the Eaſt-Indies. There are ſeveral ſpecies of them. The ſhell of this animal is ſawn in two, and one *coque* only can be obtained from each. The *coques* are very ſmall, and one is obliged to fill them with tears of maſtic to give them a body, before they can be employed. This beautiful ſnail is found generally in the ſea, and ſometimes on the ſhore." May not Pouget here mean that kind of ſnail which others call *burgeau*, the ſhells of which are, in commerce, known by the French under the name of *burgaudines*?—Should that be the caſe, the animal meant would be the *nautilus pompylius*, as may be concluded from *Hiſtoire des Antilles*, par Du Tertre, Paris 1667, 3 vol. quarto, ii. p. 239. For the author ſays, *C'eſt de leur coque que les ouvriers en nacre tirent cette belle nacre qu'ils appellent la burgandine, plus eſtimée que la nacre de perle.* Irregular pearls are called *baroques*, or Scotch pearls, becauſe abundance of ſuch were once found at Perth in Scotland. See *Phyſical. ökon. biblioth.* iii. p. 244. Some years ago artificial pearls of an unnatural ſize, called Scotch pearls, were for a little time in faſhion.

The name *able*, or *ablette*, is given to ſeveral ſpecies of fiſh; but that which produces the pearl-eſſence is the *cyprinus alburnus*, called in Engliſh the bleak. Profeſſor Hermann, at Straſburg, was ſo kind as to ſend me one of theſe fiſh, which was caught there for the purpoſe of making pearl-eſſence, and which was dried ſo carefully that the ſpecies could with certainty be diſtinguiſhed. It correſponded exactly with the figure given in Duhamel *, which has almoſt a perfect reſemblance to that given by Schoneveld †. May not the *alburnus* mentioned by Auſonius ‡ among the inhabitants of the Moſelle, be the ſame? At any rate, the bleak is to be found only in freſh water; and on account of its voracity bites readily at the hook. It is caught for the uſe of the French manufacturers in the Seine, the Loire, the Saone, the Rhine §, and ſeveral other rivers. To obtain a pound of ſcales above 4000 fiſh are neceſſary; and theſe do not produce four ounces of pearl eſſence; ſo that from eighteen to twenty thouſand are requiſite to have a pound of it. In the Chalonnois, the fiſhermen get for a pound of waſhed ſcales fifteen, eighteen, and twenty-five livres. The fiſh, which are four inches in length, and which have not a very good taſte, are ſold at a cheap rate, after their ſcales have been ſcraped off. At St. John de Maizel, or Mezel, in the Chalonnois, there is a manufactory in which 10,000 pearls are made daily *.

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* A complete account of the art of making glaſs pearls is contained in a book, which I have however not ſeen, entitled, *L'Art d'imiter les perles fines, par M. Varenne de Beoſt, correſpondant de l'Académie Royale.* An extract from it may be found in *Dictionnaire des arts et metiers, par M. Joubert*, iii. p. 370. See alſo the articles *perle* and *able* in the *Encyclopédie*, i. p. 29; xii. p. 382.

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* Traité générale des peſches, par. ii, ſuite de la troiſieme ſection, p. 493. tab. 23, fig. 1 et 2.

† Ichthyologia, auctore St. a Schonevelde. Hamburgi 1624, 4to. p. 12, tab. 1, fig. 2, albula.

‡ Quis non et virides volgi ſolatia tincas
Norit, et alburnos prædam puerilibus hamis?
Auſon. Moſel. ver. 126.

§ In the *Almanach de Straſburg* for 1780, p. 76, among the commodities ſold there were, Des ecailles d'ablettes dont on tire l'eſſence d'orient employée pour les fauſſes perles.

The firſt makers of theſe pearls muſt have laboured under a very great inconvenience, as they were acquainted with no method of preſerving the fiſhy particles for any time. They were obliged to uſe the eſſence immediately, becauſe it ſoon putrefied, and contracted an intolerable ſtench. The great conſumption, however, required that the ſcales ſhould be brought from diſtant provinces. Attempts were made to preſerve them in ſpirit of wine or brandy; but the acid of theſe liquors corroded the particles, deſtroyed their luſtre, and left them only a dull white colour. In the like manner brandy ſpoiled a real pearl, which, with the animal and the ſhell *(mactra lutraria)*, was ſent to me by Dr. Taube, at Zell. It was, therefore, a very important diſcovery for this art that theſe animal particles can be kept for a long time in volatile alkali, which is now alone uſed, and which perhaps could be uſed for many other purpoſes of the like kind *.

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* Deſcription hiſtorique et topographique du duché de Bourgogne, par M. Courtépée, tom. iv. A Dijon 1779. 8vo. p. 534.

That the inventor of theſe pearls was called Jaquin, and that he was a bead-maker at Paris, all agree; but the time of the invention ſeems to be uncertain. Some ſay that it belongs to the reign of Henry IV †; and Reaumur mentions the year 1656. Theſe pearls, however, in the year 1686, when Jaquin had an aſſiſtant named Breton, muſt not have been very common; for we are told in the *Mercure galant* of that year, that a marquis poſſeſſed of very little property, who was enamoured of a lady, gained her affections and carried his point by preſenting her with a ſtring of them, which coſt only three louis; and which ſhe, conſidering them as real ones, valued at 20,000 francs. The ſervant who put the marquis on this ſtratagem, declared that theſe pearls withſtood heat and the moiſture occaſioned by perſpiration; that they were not eaſily ſcratched, had almoſt the ſame weight as real ones, and that the perſon who ſold them warranted their durability in writing. Jewellers and pawnbrokers have, therefore, been often deceived by them. Jaquin's heirs ſtill continue this buſineſs, and have a conſiderable manufactory *au Rue de petit lion* at Paris; but that great quantity of glaſs pearls worn at preſent have not, perhaps, all come from France. It is not improbable that ſome may be made in the Netherlands and Germany; for the fiſh are not ſcarce in either of theſe countries, and the art is now well known *.

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* See Sages Chemiſche unterſuchung einiger mineralien, p. 82.

† Traité des pierres précieuſes et de la maniere de les employer en parure. Par Pouget. Paris 1762. 4to. i. p. 19.

PAVING OF STREETS.

THE moſt beneficial regulations of police, which we have inherited from our anceſtors, are, at preſent, conſidered to be ſo indiſpenſable or neceſſary, that many people imagine they muſt at all times have exiſted. If one, however, takes the trouble to inquire into the antiquity of theſe regulations, it will be found that the greater part of them are new, and that they were unknown to the largeſt and moſt magnificent cities of ancient times. Among theſe are poſts †, the night-watch, hackney coaches, and, beſides many others, the paving of ſtreets.

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* We are informed, in *Acta ſocietatis Upſalienſis*, 1741, 4to. p. 75, that theſe fiſh are caught in Holland, where they are called *alphenaer* and *koning van aſterling*.

† I reckon the poſt among police regulations, to which its object originally belonged, as well as that of the coining of money; though in the courſe of time it has been made a productive ſource of revenue, by which it has been rendered burdenſome to the public, while its utility has been leſſened.

Several cities, indeed, had paved ſtreets before the beginning of the chriſtian æra; but thoſe which are at preſent the ornament of Europe, Rome excepted, were all deſtitute of this great advantage, till almoſt the twelfth or thirteenth century. I muſt nevertheleſs acknowledge, that in the Greek and Roman authors I have hitherto met with more proofs of paved highways than of paved ſtreets. But we have reaſon to believe that the richeſt nations paid attention to the ſtreets before their doors, ſooner than to the roads before their gates. In all probability, the former were paved at different times, and by private perſons; and required ſo little expence and ſo few regulations, that no occaſion was given to remark the time when it was done. On the other hand, for the conſtructing of highways many miles in length, the concurrence of States, and the conſent and aſſiſtance of all the inhabitants were neceſſary; and, on that account, ſuch circumſtances were inſerted in annals, and they were ſometimes copied afterwards by hiſtorians, and mentioned in their works. In the Eaſt, where the roads are not ſpoilt, as among us, by ſnow, ice and rain, and where many cities were built on eminences and in dry ſituations, the paving of ſtreets and highways may have been later thought of than might be expected, when we conſider the refinement of the ancient people who inhabited that country, and the progreſs they had made in the arts. Such undertakings alſo were often retarded by the want of ſtones; an obſtacle which many nations overcame with an ingenuity and patience at which we, among whom workmen are fewer, and the price of labour higher, becauſe we have more wants, and enjoy more liberty, are not a little aſtoniſhed. It is however to be conjectured, that thoſe people who firſt carried on the greateſt trade were the firſt who paid attention to have good ſtreets and highways, in order to facilitate intercourſe, ſo neceſſary to keep up the ſpirit of commerce.

This conjecture is in ſome meaſure confirmed by the teſtimony of Iſiodorus *, who ſays that the Carthaginians had the firſt paved ſtreets, and that their example was ſoon copied by the Romans. Long before that period, however, Semiramis paved highways, as we are told by the vainglorious inſcription which ſhe herſelf cauſed to be put

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* Strata dicta, quaſi vulgi pedibus trita. Lucretius: Strataque jam vulgi pedibus detrita viarum. Ipſa eſt et delapidata, id eſt lapidibus ſtrata. Primum autem Pœni dicuntur lapidibus vias ſtraviſſe; poſtea Romani eas per omnem pene orbem diſpoſuerunt, propter rectitudinem itinerum, et ne plebs otioſa eſſet. *Origin.* lib. xv. cap. 16.

up[*]. Of the paving of the Grecian cities I know nothing farther than that at Thebes the ſtreets were under the inſpection of the telearchs, who had the care of keeping them in repair, and of cleaning them. This office, which was there held in contempt, the ſpiteful inhabitants conferred upon Epaminondas, in order to diſgrace him; but, by his prudence and attention to the public good, he rendered it ſo reſpectable, that it was afterwards ſought for as an honourable employment. The ſtreets of Thebes, therefore, were paved, elſe how would it have been poſſible to clean them[†]? Whether Jeruſalem was paved I do not know; for, in the firſt book of Kings mention is made only of the fore-court of the temple[‡]. Joſephus[§] relates that the Jews propoſed to Agrippa, after the building of the temple was finiſhed, to employ the workmen who had been diſcharged, the number of whom, with Jewiſh exaggeration, he makes amount to eighteen thouſand, in paving the ſtreets; but this however was not done. We read in the Talmud *, that the ſtreets of Jeruſalem were ſwept every day, which undoubtedly implies a hard and ſolid pavement.

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[*] Strabo, lib. xvi. p. 1071. Diodor. Sic. lib. ii. cap. 13. Polyæni Stratagem. lib. viii. cap. 26, where we find the inſcription as follows: Πετρας αβατους σιδηρῳ κατειργασαμην· Ὁδοις ετεμον εμοις οχημασιν. Invias petras ferro domui. Vias meis vehiculis ſecui quas ne feræ quidem prius ambulaverant. The laſt ſentence may mean alſo, that ſhe had travelled theſe roads with her carriages, which left deep ruts behind them.

[†] Epaminondas, cum ei cives irati ſternendarum in oppido viarum contumeliæ cauſſa curam mandarent (erat enim illud miniſterium apud eos ſordidiſſimum), ſine ulla cunctatione id recepit, daturumque ſe operam ut brevi ſpecioſiſſimum fieret aſſeveravit. Mirifica deinde procuratione abjectiſſimum negotium pro ampliſſimo ornamento expetendum Thebis reddidit. *Valerius Max.* lib. iii. cap. 7. The ſame account is given, but more fully, by Plutarch, in *Reipublicæ gerendæ præcepta*, p. 818.

[‡] 1 Kings, chap. vii. v. 12.

[§] Antiquit. lib. xx. cap. 9.

That neither the ſtreets of Rome nor the roads around it were paved during the time of its kings, is well known †. In the year 188 after the abolition of the monarchical form of government, Appius Claudius, who was then cenſor, conſtructed the firſt real highway, which was as properly called after him the Appian way, as it was named on account of its excellence the queen of roads ‡. The time however when the ſtreets began to be paved, cannot with certainty be determined; for the paſſage of Livy ||, from which ſome have en-

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* Peſachim, fol. 71. Metzia, fol. 26. See J. E. Fabers Archæologie der Hebräer. Halle 1773, 8vo. p. 340.

† Hiſtoire des grands chemins de l'empire Romain, par Nic. Bergier. Paris 1622, 4to. liv. i. chap. viii. p. 21.

‡ Appia longarum teritur regina viarum. *Statius*, *Sylv.* ii. 2. v. 12

|| Cenſores vias ſternendas ſilice in urbe, glarea extra urbem ſubſtruendas marginandaſque primi omnium locaverunt. *Livius*, lib. xli. cap. 27.

deavoured to prove that it was in the year 578 after the building of the city, is inconcluſive, as it will admit of various explanations equally probable. It may be read, without forcing the ſenſe, as if Livy ſaid that the pavement of the ſtreets was then covered with ſand for the firſt time; that the ſtreets were then firſt paved at the public expence, or that the paving of them was then performed for the firſt time by contract. Beſides, we are told by Livy himſelf*, that the cenſors in the year of the city 584 cauſed the ſtreets to be paved from the oxen-market (forum Boarium) to the temple of Venus, and around the ſeats of the magiſtrates in the great circus: but the information of the ſame hiſtorian that the ædiles in the year 459 cauſed the ſtreets to be paved from the temple of Mars to the Bovile, and from the Capena gate to the temple of Mars †, does not apply here, as ſome have imagined; for the temple of Mars was without the city, and the author ſpeaks not of ſtreets but of highways. The extravagant Heliogabalus cauſed the ſtreets around the palace, or on the Palatine mount, to be paved with foreign marble ‡. The inſpection of the ſtreets belonged to the ædiles; and, under certain circumſtances, occaſionally to the cenſors. In the courſe of time, however, particular officers, *curatores viarum*, called on account of their number *quatuor viri viarum*, were appointed for that expreſs purpoſe. Thus we are told that the two brothers, Publii Malleoli, when curule ædiles, cauſed the *Mons Publicius* to be paved, ſo that carriages could paſs from the ſtreet Velia to Mount Aventine *. That ſtreets paved with lava, having deep ruts made by the wheels of carriages, and raiſed banks on each ſide for the accommodation of foot-paſſengers, were found both at Herculaneum and Pompeii, is well known from the information of various travellers †.

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* Viam e foro Boario ad Veneris, et circa foros publicos, et ædem Matris Magnæ in Palatio faciendam locaverunt. Lib. xxix. cap. 37.

† Semitamque ſaxo quadrato a Capena porta ad Martis ſtraverunt. Lib. x. cap. 23. Equally inapplicable are the paſſages lib. xxxviii. cap. 28, and lib. x. cap. 47.

‡ Stravit et ſaxis Lacedæmoniis ac porphyreticis plateas in Palatio,

Of modern cities, the oldeſt pavement is commonly aſcribed to that of Paris; but it is certain

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Palatio, quas Antoninianas vocavit; quæ ſaxa uſque ad noſtram memoriam manſerunt, ſed nuper eruta et execta ſunt. *Æl. Lamprid. Vita Heliogab.* cap. 24. This paſſage has been illuſtrated neither by Caſaubon nor Saumaiſe.

* Parte locant clivum, qui tunc erat ardua rupes
Utile nunc iter eſt; Publiciumque vocant.
Ovid. Faſtor. lib. v. ver. 293.

See alſo Marc. Varro, lib. iv. de L. L. Feſtus p. 310. An examination of the queſtion whether the ædiles or cenſors had the inſpection of the ſtreets may be found in Ducker's notes on Liv. lib. x. cap. 32.

† G. H. Martini, Das gleichſam auflebende Pompeii. Leipſig 1779, 8vo. p. 122. H. M. A. Cramers Nachrichten zur geſchichte der Herculaniſchen entdeckungen. Halle 1773, 8vo. p. 50.

that Cordova in Spain was paved ſo early as the middle of the ninth century, or about the year 850, by Abdorrahman II, the fourth Spaniſh caliph. This prince, who knew the value of the arts and ſciences, and who favoured trade ſo much that abundance in his reign prevailed throughout the whole land *, cauſed water to be conveyed into that city, which was then his capital, by leaden pipes, and ornamented it with a moſque and other elegant buildings †.

The capital of France was not paved in the twelfth century; for Rigord, the phyſician and hiſtorian of Philip II, relates, that the king ſtanding one day at a window of his palace near the Seine, and obſerving that the carriages which paſſed threw up the dirt in ſuch a manner that it produced a moſt offenſive ſtench, his majeſty reſolved to remedy this intolerable nuiſance by cauſing the

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* Cardonnes Geſchichte von Africa und Spanien unter den Arabern, überſetzt von C. G. von Murr. Nurnberg 1768, 8vo. i. p. 187.

† Anno Arabum ducenteſimo trigeſimo ſexto, regni autem ſui trigeſimo, præcepit plateas Cordubæ pavimento lapideo ſolidari, et aquam a montanis, plumbeis fiſtulis derivari, et fontes juxta mezquitam, et juxta præſidium et in aliis locis eductione nobili emanare. *Roderici Ximenez, archiepiſcopi Toletani, Hiſtoria Arabum,* cap. xxvi. p. 23. This hiſtory of Roder. Ximenes may be found at the end of Erpenius' *Hiſtoria Saracenica* publiſhed in Arabic and Latin at Leyden in 1625.

ſtreets to be paved; which was accordingly done, notwithſtanding the heavy expence that had prevented his predeceſſors from introducing the ſame improvement. The orders for this purpoſe were iſſued by the government in the year 1184; and upon that occaſion, as is ſaid, the name of the city, which was then called Lutetia on account of its dirtineſs, was changed to that of Paris [*]. This ſervice rendered to Paris by that ſovereign, who firſt alſo cauſed the cathedral to be ſurrounded by a wall, is confirmed by various hiſtorians [†]. Mezeray informs us, that Gerard de Poiſſy, then intendant of the finances, expended eleven thouſand marks of ſilver in this undertaking. It appears that a certain income was allowed to the city for defraying the expences; for in 1285, a hundred years after, when it was propoſed that the pavement ſhould be carried without the gate of St. Martin, the citizens excuſed themſelves from the work, by ſaying that the funds aſſigned to them were not ſufficient for that purpoſe *. It is certain, that in the year 1641 the ſtreets in many quarters of Paris were not paved †.

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[*] Factum eſt autem poſt aliquot dies, quod Philippus rex ſemper Auguſtus Pariſiis aliquantulum moram faciens, dum ſollicitus pro negotiis regni agendis in aulam regiam deambularet, veniens ad palatii feneſtras, unde fluvium Sequanæ pro recreatione animi quandoque inſpicere conſueverat rhedæ equis trahentibus, per civitatem tranſeuntes, fœtores intolerabiles lutum revolvendo procreaverunt. Quod rex in aula deambulans ferre non ſuſtinens, arduum opus, ſed valde neceſſarium, excogitavit, quod omnes prædeceſſores ſui ex nimia gravitate et operis impenſa aggredi non præſumpſerant. Convocatis autem burgenſibus cum præpoſito ipſius civitatis, regia auctoritate præcepit, quod omnes vici et viæ totius civitatis Pariſii duris et fortibus lapidibus ſternerentur. Ad hoc enim chriſtianiſſimus rex conabatur, quod nomen antiquum auferret civitati; lutea enim a luti fœtore prius dicta fuerat. Sed gentiles, quondam, hujuſmodi nomen propter fœtorem abhorrentes, a Paride Alexandro filio Priami regis Trojæ Pariſios vocaverunt. *Rigordus de geſtis Phil. Auguſti* in *Hiſt. Script. Franc.* Pariſiis 1649. fol. p. 16. Publiſhed by Ducheſne.

[†] Circa eadem tempora Philippus magnanimus, pia et regali indignatione ſuper intolerantiam luti vicorum Pariſiacæ civitatis motus, fecit omnes vicos quadratis lapidibus pavimentari. *Gullielmi*

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lielmi Armorici Hiſtoria de vita et geſtis Philippi Auguſti, in the above-quoted collection of Ducheſne, p. 73.

Circa eadem tempora (1185) Philippus magnanimus, pia et regali indignatione ſuper intolerantia luti vicorum Pariſiacæ civitatis motus, fecit omnes vicos ejus quadratis lapidibus pavimentari, et tunc recte primo civitas amiſit proprietatem antiqui vocabuli quo Lutetia vocabatur, ad cujus exemplum aliæ civitates et caſtella, vicos et plateas, pontes et introitus et exitus univerſos et ſtratas publicas ſtraverunt lapidibus duriſſimis et quadratis. *Alberici monachi Trium Fontium Chronicon*, editum a G. G. Leibnitio, Lipſiæ 1698, 4to. p. 367.

* In the royal patent of 1285, which may be found in *Hiſtoire de la Ville de Paris*, par Felibien, i. p. 104, are the following words: Nec ſufficerent redditus conceſſi dictis burgenſibus, præ pavando in quatuor cheminis principalibus, ad pavandum in locis prædictis.

† A proof of this may be ſeen in *De la Mare*, iv. p. 197, who gives the beſt account reſpecting the regulations made to keep in repair the pavement of the ſtreets of Paris. The later regulations are given by Perrot in *Dictionnaire de voierie*, Paris 1782, 4to. p. 315.

It is very probable that other opulent cities, finding the benefit which the capital derived from this improvement, were induced to follow its example. At any rate we know that Dijon, which was then reckoned one of the moſt beautiful, had paved ſtreets ſo early as the year 1391, to which Philip the Bold, duke of Burgundy, the ſecond huſband of Margaret heireſs of Flanders and other parts of the Netherlands, contributed two thouſand livres; and in 1424 paviors were employed on all the ſtreets*. Hiſtorians remark, that after this period dangerous diſeaſes, ſuch as the dyſentery, ſpotted fever, and others, became leſs frequent in that city.

That the ſtreets of London were not paved at the end of the eleventh century, is aſſerted by all hiſtorians. As a proof of this, they relate that in the year 1090, when the church of St. Mary-le-Bow, in Cheapſide, was unroofed by a violent ſtorm of wind, four pillars or beams, which were twenty-ſix feet in length, ſunk ſo deep into the ground, that ſcarcely four feet of them appeared above the ſurface. The ſtreets of London then, ſays Howel, were not paved, but conſiſted of ſoft earth †. I can, however, find no account of the time when paving was firſt introduced. It appears that the pavement of this immenſe city became gradually extended as trade and opulence increaſed. Several of the principal ſtreets, ſuch as Holborn, which at preſent are in the middle of the city, were paved for the firſt time by royal command, in the year 1417*. Others were paved under Henry VIII †, ſome in the ſuburbs in 1544 ‡, others in 1571 and 1605 ||, and the great market of Smithfield, where cattle are ſold, was firſt paved in 1614 §.

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* Deſcription hiſtorique et topographique du duché de Bourgogne, par M. Courtépée, tom. i. p. 233, & tom. ii. p. 62.

† Anderſon's Hiſtory of Commerce, vol. i. p. 483.

Of German cities I can mention only Augſburg, which by its trade ſoon roſe to ſuch eminence as to be able to rival magnificent Rome, of which it was a colony, in many expenſive improvements. This

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* In the king's order it was ſaid, that the highway named Holbourn in London (alta via regia in Holbourne Londoniæ) was ſo deep and miry, that many perils and hazards were thereby occaſioned as well to the king's carriages paſſing that way as to thoſe of his ſubjects; he therefore ordained two veſſels, each of twenty tons burthen, to be employed at his expence, for bringing ſtones for paving and mending the ſame. *Anderſon's Hiſt. of Com.* i. p. 244.

† In this order the ſtreets were deſcribed "as very foul, and full of pits and ſloughs, very perilous, and (noyous) noiſome, as well for the king's ſubjects on horſeback as on foot, and with carriage." *Anderſon*, ut ſupra p. 370.

‡ Anderſon, p. 373.

|| Anderſon, p. 469.

§ Anderſon, i. p. 491. See alſo A new Hiſtory of London by J. Noorthouck, London 1773, 4to. p. 121, 217. 414. 436.

city from the earlieſt periods had ſmall ſubterranean paſſages under the ſtreets for conveying away filth, which in ſome meaſure reſembled the Roman *cloacæ*. Hans Gwerlich, a rich merchant there, having cauſed a neat foot-path to be made before his houſe, in the oxen-market, in 1415, gave riſe to the paving of the city; for this convenience was ſo much admired, that after that time all the ſtreets were paved ſucceſſively at the expence of the government [*]. Berlin, in the firſt half of the laſt century, was not entirely paved. The new market was firſt paved in 1679, and the following years, and King-ſtreet before the houſes in 1684. The ſquare behind the cathedral and before the preſent tilt-yard remained without pavement in 1679 [†].

When a ſolid bottom had been given to ſtreets, the cleanſing of them, which, as the Roman prætors ſaid, is a continual improvement [‡], was then rendered poſſible. At Rome were appointed *tribuni rerum nitentium*, who had the care of cleaning the ſtreets, markets, temples, baths and other public places [||]. Strict orders were given that no filth ſhould be thrown into the river or ſtreets; whoever tranſgreſſed againſt this prohibition was ſubjected to puniſhment, and obliged to repair the damage *. The public ſhores, *cloacæ*, under the ſtreets contributed very much to facilitate the cleaning of them, and on that account they were commonly full of mud †, as thoſe of Paris are at preſent, notwithſtanding the expenſive regulations eſtabliſhed to prevent that nuiſance.

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[*] Von Stetten, Kunſtgeſchichte der ſtadt Augſburg, p. 87.

[†] Niccolai, Beſchreibung der ſtadt Berlin, i. p. 26.

[‡] Sed et purgare refectionis portio eſt. *Digeſt*. lib. xlii. tit. 2.

[||] Notitia utraque dignitatum, et in eam Pancirolli commentarium. Lugduni 1608. Notit. imperii occident, cap. 19. This work may be found in Grævii Theſ. Antiq. Rom. vol. vii.

Some centuries after the city was paved, every citizen of Paris was obliged to repair the ſtreet before his houſe and to clean it at his own expence, as is expreſsly commanded in an order iſſued by Philip the Bold ‡ in the year 1285. The public, however, are often careleſs and negligent reſpecting the moſt beneficial regulations, when the maintaining them is attended with trouble and expence be it ever ſo ſmall. By this want of attention, all the ſtreets of Paris were in the fourteenth century entirely ſpoiled and filled with dirt; but they were again repaired; and in 1348 a law was firſt made for inflicting puniſhment upon thoſe who neglected to clean them *. This law was rendered more ſevere in 1388, and ſeveral times afterwards. The novelty of it, the dread of puniſhment, and the vigilance of the new inſpectors produced ſuch an effect that the inhabitants of one or more neighbouring ſtreets joined together and kept at their commom expence a dirt cart, which at that time was called *un tombereau*; but the nobility and the clergy, who always wiſh for immunities, endeavoured to exempt themſelves from this burthen. The markets and public ſquares remained therefore uncleaned, and became ſtill dirtier; as thoſe who reſided in the neighbourhood began to throw filth into them privately in the night-time, in order to avoid the expence of having it carried away, till at length theſe places were rendered ſo impaſſable, that the toymen who frequented them with their wares wiſhed to abandon them. For this reaſon it was enacted in the year 1399, that no one ſhould be excepted from cleaning the ſtreets; and an order was iſſued in 1374, that all thoſe who lived in the markets, together with the toymen who had booths there, ſhould clean them at their joint expences †. Many now made the removing of dirt a trade, and entered into contracts for that purpoſe; but they as well as the paviors turned ſo extravagant in their demands, that a price was ſet upon the labour of the former in 1396, and the latter in 1501 were united into a company, every member of which was obliged to ſubſcribe to certain regulations *.

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* Digeſtorum lib. xliii. tit. 12. and lib. ix. tit. 3, de his qui effuderint vel dejecerint.

† Et prætor medio cogitur ire luto. *Martial.* Epig. vii. 61. This line in ſome editions is in epig. 60. See alſo Juvenal, ſat. iii. ver. 247.

‡ A full hiſtory of the regulations made reſpecting the cleaning of the ſtreets of Paris may be found in *Continuation du traité de la police*, p. 200.

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* De la Mare, iv. p. 202.

† De la Mare, iv. p. 172. 203.

When the city at length increaſed in ſize and population, the cleaning of the ſtreets became too troubleſome and expenſive to be left any longer to the care of individuals. Beſides, thoſe who inhabited the ſuburbs complained, and with great juſtice, that the burthen lay ſo heavy upon them as to be intolerable; becauſe all the carts which entered the city, or which conveyed filth from it, rendered their ſtreets much dirtier than the reſt. It was reſolved therefore, in the year 1609, that the ſtreets ſhould be cleaned at the public expence, under the inſpection of the police; and a certain revenue in wine was ſet apart for that purpoſe. The firſt perſon with whom a contract was entered into for this ſervice, was allowed yearly, for cleaning the whole city, 70,000 livres, which ſum was raiſed in 1628 to 80,000 †. In 1704 the Pariſians were obliged to collect 300,000 livres, for which Government undertook to maintain the lamps and clean the ſtreets; but in 1722 this contribution was increaſed to 450,000. The laſt contract with which I am acquainted is that of the year 1748,

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[*] De la Mare, p. 205.

[†] De la Mare, iv. p. 243. 239. 216.

by which the undertakers were to be allowed yearly, during ſix years, for removing the dirt 200,000 livres, and for clearing away the ſnow and ice in winter 6000 more, making in all the ſum of 206,000 livres *.

All theſe regulations and expences, however, would have undoubtedly been attended with very little benefit, had not deliberate dirtying of the ſtreets been ſtrictly prohibited, and all opportunities of doing ſo been as much as poſſible prevented. As the young king Philip, whom his father Louis the Fat had united with himſelf as co-regent, and cauſed to be crowned at Rheims, was paſſing St. Gervais on horſeback, a ſow running againſt his horſe's legs made him ſtumble, and the prince being thrown was ſo much hurt, that he died next morning, October the third 1131. On account of this accident an order was iſſued, that no ſwine in future ſhould be ſuffered to run about in the ſtreets; but this was oppoſed by the abbey of St. Anthony, becauſe, as the monks repreſented, it was contrary to the reſpect due to their patron to prevent his ſwine from enjoying the liberty of going where they thought proper. It was found neceſſary therefore to grant theſe clergy an excluſive privilege, and to allow their

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* This contract is inſerted in *Dictionnaire de voierie*, par Perrot, p. 305. In 1445 ſix carts were employed at Dijon in cleaning the ſtreets, as mentioned in the firſt volume of the before-quoted *Deſcription du duché de Bourgogne*, p. 234.

their ſwine, if they had bells faſtened to their necks, to wallow in the dirt of the ſtreets without moleſtation *.

A very improper liberty prevailed at Paris in the fourteenth century, which was, that all perſons might throw any thing from their windows whenever they choſe, provided they gave notice three times before, by crying out *Garde l'eau*, which is as much as to ſay, Take care of water. This privilege was forbidden in 1372, and ſtill more ſeverely in 1395 †. A like practice however ſeems to have continued longer at Edinburgh, for in the year 1750, when people went out into the ſtreets at night, it was neceſſary, in order to avoid diſagreeable accidents from the windows, that they ſhould take with them a guide, who as he went along called out, with a loud voice, in the Scotch dialect, *Had your haunde*, Stop your hand ‡.

This practice however would not have been ſuppreſſed at Paris, had not the police paid particular attention to promote the interior cleanlineſs of the houſes, and the erection of privies. Some will perhaps be aſtoniſhed that theſe conveniencies ſhould have been firſt introduced into the capital of France by an order from government in the ſixteenth century; eſpecially as they are at preſent conſidered to be ſo indiſpenſably neceſſary, that few ſummer-houſes are conſtructed without them. Thoſe, however, to whom this affords matter of ſurpriſe muſt be ſtill more aſtoniſhed when they are told that the reſidence of the king of Spain was deſtitute of this improvement at the very time that the Engliſh circumnavigators found privies conſtructed in the European manner near the habitations of the cannibals of New Zealand *. But Madrid is not the royal reſidence which has had dirty ſtreets longeſt on account of this want. Privies began to be erected at Warſaw for the firſt time only within theſe few years †.

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* Hiſtoire de la ville de Paris, par Sauval, vol. ii. p. 640. Saintfoix, Verſuche in der geſchichte der ſtadt Paris, Kopenhagen 1757, 8vo. i. p. 147.

† De la Mare, iv. p. 253. Perrot, in Diction. de Voierie, p. 307.

‡ Letters from Scotland, 1760, 2 vol. 8vo.

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* An account of the voyage in the Southern Hemiſphere, by Hawkeſworth, 1773, 4to. vol. ii. p. 281.

† Whoever wiſhes to enter deeper into the hiſtory of this family convenience, certainly an object of police, the improvement of which the Academy of Sciences at Paris did not think below its notice, may conſult the following work: *Mémoires de l'Academie des ſciences, inſcriptions, belles lettres, beaux arts, &c. nouvellement établie à Troyes en Champagne.* A Troyes et Paris 1756, two ſmall volumes 12mo. The author, who by this piece of ridicule wiſhed, perhaps, to avenge himſelf of ſome academy which did not admit him as a member, has collected from the Greek and Latin writers abundance of dirty paſſages reſpecting this queſtion: *Si l'uſage de chier en plein air étoit univerſel chez les anciens peuples.* He proves from a paſſage of Ariſtophanes, *Eccleſiaz.* ver. 1050, that the Greeks had privies in their houſes.

In the Pariſian code of laws, *Coûtume de Paris*, which was improved and eſtabliſhed in 1513, it is expreſsly ordered, that every houſe ſhould have a privy [*]. This order, with the denunciation of ſeverer puniſhment in caſe of diſobedience, was renewed in 1533; and in 1538 the under officers of police were obliged to examine the houſes, and to report the names of thoſe who had not complied with this beneficial regulation. It appears, however, that the order of 1533 was not the lateſt; for in 1697, and even in 1700, the police was under the neceſſity of ſtrictly commanding “ that people ſhould “ conſtruct privies in their houſes, and repair thoſe “ already conſtructed, and that within a month at “ fartheſt, under the penalty of being fined in caſe “ of neglect, and of having their houſes ſhut up un“ til they ſhould be in a proper condition.” This order is given in the ſame words in the Coûtume de Mante, Etampes, Nivernois, Bourbonnois, Calais, Tournay and Melun [†]. That iſſued at Bourdeaux is of the year 1585 [‡].

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[*] De la Mare, i. p. 568, and iv. p. 254. Tous propriétaires de maiſons de la ville et fauxbourgs de Paris ſont tenus avoir latrines et *privez* ſuffiſans en leurs maiſons.

[†] De la Mare, ut ſupra. Coûtume de Mante, art. 107. Etampes, art. 87. Nivernois, chap. x. art. 15. Bourbonnois, art. 515. Calais, art. 179. Tournay, tit. 17. art. 5. Melun, art 209.

[‡] Anciens et nouveaux ſtatuts de la ville et cité de Bourdeaux. A Bourdeaux 1612, 4to. p. 134.

All theſe regulations of police were not much older in Germany than in Paris. The cleaning of the ſtreets was conſidered there as an almoſt diſhonourable employment, which in ſome places was aſſigned to the Jews, and in others to the executioner's ſervants. The Jews were obliged to clean the ſtreets of Hamburgh before the preſent regulations were eſtabliſhed *. How old theſe may be I do not know, but in the year 1585 there were dirt-carts in that city, and a tax was paid by the inhabitants for ſupporting them. At Spandau, in 1573, the ſkinners were obliged to ſweep the market-place, which was not then paved, and for this ſervice they were paid by the council †. In the beginning of the laſt century the ſtreets of Berlin were never ſwept, and the ſwine belonging to the citizens wallowed in the increaſing dirt the whole day, as well as in the kennels, which were choked up with mud. In the year 1624, when the elector deſired the council to order the ſtreets to be cleaned, they replied, that it was of no conſequence, as the citizens at that time were buſy with their farms. Near Peter's church there was a heap of duſt ſo large that it almoſt obſtructed all paſſage, and it was with great difficulty, and not until ſtrict orders had been often repeated, that the elector could get the

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* Von Grieſheims Anmerkungen über den tractat: Die ſtadt Hamburg. Hamburg 1759, 8vo. p. 90.

† Hiſtoriſche Beytrage die Preuſſiſchen und benachbarten ſtaaten betreffend. Berlin 1784, 4to. iii. p. 373.

inhabitants to remove it. For a long time dirt of every kind was emptied in the new market-place, and lay there in ſuch quantity, that an order was iſſued in 1671, that every countryman who came to the market ſhould carry back with him a load of dirt. The director of the public mill made continual complaints, that, by the dirt being ſhot down near the long bridge, the mill-dam was prevented from flowing. Hog-ſties were erected in the ſtreets, ſometimes even under the windows. This practice was forbidden by the council in 1641 *; but it was nevertheleſs continued until the elector at length, in the year 1681, gave orders that the inhabitants ſhould not feed ſwine; and this prohibition was carried into effect without any exception, as St. Anthony had no abbeys at Berlin. Privies, however, ſeem to have been common in the large and flouriſhing towns of Germany much earlier than in the capital of France; and thoſe who are not diſpoſed to find fault with me for introducing proofs here which hiſtorians have not

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* Nicholai Beſchreibung von Berlin, p. 26. The author quotes, from the order publiſhed at Berlin, Nov. 30, 1641, reſpecting the buildings of the city, ſection fourth, the following words: "Many citizens have preſumed to erect hog ſties in the open ſtreets, and often under the windows of bed-chambers, which the council cannot by any means ſuffer;" and in the ſeventeenth ſection hog-ſties are forbidden to be erected in future in the ſmall ſtreets near the milk-market.

not diſdained to record, may read what follows [*]: In the annals of Franckfort on the Mayne, where mention is made of the cheapneſs of former times, we are told how much a citizen there gave in the year 1477 for cleaning his privy [†]. We are informed alſo, that in 1496 an order was iſſued by the council forbidding the proprietors of houſes ſituated in a certain place planted with trees to erect privies towards the ſide where the trees were [‡]; and that in 1498 George Pfeffer von Hell, J. U. D. and chancellor of the electorate of Mentz, fell by accident into the privy, and there periſhed [||]. It appears however from the ſtreets and houſes of moſt of our cities, that they were conſtructed before ſuch conveniencies were thought of, and that theſe were erected through force at a later period.

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[*] Frivola hæc fortaſſis cuipiam et nimis levia eſſe videantur, ſed curioſitas nihil recuſat. *Vopiſcus in Vita Aureliani*, cap. 10.

[†] Chronica der ſtadt Frankf. von C. A. von Lerſner, i. p. 512.

[‡] Ibid. ii. p. 23.

[||] Ibid. ii. p. 210.

COLLECTIONS OF NATURAL CURIOSITIES.

IF it be true that the written accounts which thoſe who had recovered from ſickneſs cauſed to be drawn out of their cure, their diſorder and the medicines employed to remove it, and to be hung up in the temples, particularly that of Æſculapius, were the firſt collections of medical obſervations [*], as ſeems to appear from the account of Hippocrates, who did not diſdain to make uſe of them in order to acquire information [†], we have every reaſon to conjecture, that the rare animals, plants and minerals generally preſerved in the temples alſo, were the firſt collections of natural curioſities, and that they may have contributed as much to promote the knowledge of natural hiſtory, as thoſe tablets to improve the art of medicine. Natural objects of uncommon ſize or beauty, and other rare productions, on which nature ſeemed to have exerted her utmoſt power, were in the earlieſt periods conſecrated to the gods [‡]. They were conveyed to the temples, where their value became ſtill enhanced by the ſacredneſs and antiquity of the place; where they continued more and more to excite reſpect and awaken curioſity, and where they were preſerved as memorials to the lateſt generations, with the ſame reverence as the other furniture of theſe buildings [*]. In the courſe of time theſe natural curioſities dedicated to the gods became ſo numerous, that they formed collections which may be called large for thoſe periods, and for the infant ſtate in which natural hiſtory then was.

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[*] Fragments of ſuch inſcriptions have been collected by Mercurialis in his work *De arte gymnaſtica*, lib. i. cap. 1, from which they have been copied by Barchuſen into his *Hiſtoria Medicinæ*, Amſtel. 1710, 8vo. p. 7.

[†] Plin. lib. xxix. cap. 1. Strabo, lib. xiv.

[‡] Etiam nunc Deo præcellentem arborem dicant. *Plin.* lib. xii. cap. 2.

When Hanno returned from his diſtant voyages, he brought with him to Carthage two ſkins of the hairy women whom he found on the Gorgades iſlands, and depoſited them as a memorial in the temple of Juno, where they continued till the deſtruction of the city [†]. The horns of a Scythian animal, in which the Stygian water that deſtroyed every other veſſel could be contained, were ſent by Alexander as a curioſity to the temple of Delphi, where they were ſuſpended, with an inſcription, which has been preſerved by Ælian [‡]. The monſtrous horns of the wild bulls which had occaſioned ſo much devaſtation in Macedonia, were by order of king Philip hung up in the temple of Hercules *. The unnaturally formed ſhoulder bones of Pelops were depoſited in the temple of Elis †. The horns of the ſo called Indian ants were ſhewn in the temple of Hercules at Erythræ ‡; and the crocodile found in attempting to diſcover the ſources of the Nile was preſerved in the temple of Iſis at Cæſarea ||. A large piece of the root of the cinnamon-tree was kept in a golden veſſel in one of the temples at Rome, where it was examined by Pliny §. The ſkin of that monſter which the Roman army in Africa attacked and deſtroyed, and which probably was a crocodile, an animal common in that country, but never ſeen by the Romans before the Punic war, was by Regulus ſent to Rome, and hung up in one of the temples, where it remained till the time of the Numantine war ¶. In the temple of

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[*] Pliny ſays in his preface: Multa valde pretioſa ideo videntur, quia ſunt templis dicata.

[†] Plin. lib. vi. cap. 31.

[‡] Ælian. Hiſt. Animalium, lib. x. cap. 40.

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* We are ſo informed by two Greek epigrams.

† Plin. lib. xxviii. cap. 4.

‡ Plin. lib. xi. cap. 31.

|| Plin. lib. v. cap. 9. This crocodile was ſtill remaining in the author's time.

§ Plin. lib. xii. cap. 19.

¶ Plin. lib. viii. cap. 12. Valer. Max. lib. i. cap. 8. Oroſius, lib. iv. cap. 8. Corium autem ejus Romam devectum (quod fuiſſe centum viginti pedum ſpatio ferunt) aliquamdiu cunctis miraculo fuit. *Jul. Obſequens de prodigiis*, cap. 29. Hujus ſerpentis maxillæ uſque ad Numantinum bellum in publico pependiſſe dicuntur. May not this animal have been the *Boa conſtrictor?*

Juno, in the iſland of Melita, there were a pair of elephants teeth of extraordinary ſize, which were carried away by Maſiniſſa's admiral, and tranſmitted to that prince, who, though he ſet a high value upon them, ſent them again back becauſe he heard they had been taken from a temple *. The head of a baſiliſc was exhibited in one of the temples of Diana †; and the bones of that ſea monſter, probably a whale, to which Andromeda was expoſed, were preſerved at Joppa, and afterwards brought to Rome ‡. In the time of Pauſanias, the head of the celebrated Calydonian boar was ſhewn in one of the temples of Greece; but it was then deſtitute of briſtles, and had ſuffered conſiderably by the hand of time. The monſtrous tuſks of this animal were brought to Rome, after the defeat of Anthony, by the emperor Auguſtus, who cauſed them to be ſuſpended in the temple of Bacchus ‖. Apollonius tells us, that he ſaw in India

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* Cicero in Verrem, iv. cap. 46. Valer. Max. lib. i.

† Scaliger de Subtilit. lib. xv. exercit. 246.

‡ Plin. lib. ix. cap. 5, and lib. v. 13. 31. Strabo, lib. xvi: Ανδρομεδαν εκτεθηναι τῳ κητει.

‖ Pauſanias, in Arcadicis, cap. 46 and 47. Αναθηματα δε εν τῳ ναῳ τα αξιολογωτατα, εϛι μεν το δερμα ὑος του Καλυδωνιου· διεσηπετο δε ὑπο του χρονου και ες απαν ην τριχων ηδε ψιλον. In templo memoratu digniſſima dona ſunt: apri Calydonii corium, putre jam præ vetuſtate, et ſetis undique nudatum.

ſome of thoſe nuts which in Greece were preſerved in the temples as curioſities [*].

It is certain, however, that all theſe articles, though preſerved in the temples of the ancients as rarities or memorials of remarkable events, or as objects calculated to ſilence unbelief, were not properly kept there for the purpoſe to which our collections of natural curioſities are applied; but at the ſame time it muſt be allowed that they might be of as much utility to naturaliſts as the tablets in which patients who had recovered thanked the gods for their cures, were to phyſicians.

We are told by Suetonius, that the emperor Auguſtus had in his palace a collection of natural curioſities [†]. I, however, do not remember that any of the ancient naturaliſts make mention of their own private collections, though it is well known that Alexander gave orders to all huntſmen, bird-catchers, fiſhermen, and others, to ſend to Ariſtotle whatever animals they could procure [*]; and although Pliny was accuſtomed to make obſervations on ſuch as he had an opportunity of ſeeing. No doubt can be entertained that a collection of natural curioſities was formed by Apuleius, who, next to Ariſtotle and his ſcholar Theophraſtus, certainly examined natural objects with the greateſt ardour and judgment; who cauſed animals of every kind, and particularly fiſh, to be brought to him either dead or alive, in order to deſcribe their external and internal parts, their number and ſituation, and to determine their characteriſing marks, and eſtabliſh their real names; who undertook diſtant journeys to become acquainted with the ſecrets of nature; and who on the Getulian mountains collected petrifactions, which he conſidered as the effects of Deucalion's flood [†]. It is much to be lamented that the zoological works of this learned and ingenious man have been loſt.

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[*] Philoſtrat. in Vita Apollon. lib. iii. cap. 5. Ενταυθα και τα καρυα φυεσθαι φασιν, ων πολλα προς ιεροις ανακειται τοις δευρο, θαυματος ενεκα. His quoque, ut ipſi aiunt, nuces creſcunt, cujuſmodi multæ apud nos in templis aſſervantur, ut admirationi ſint.—I conjecture that theſe nuts were cocoa-nuts.

[†] Sua prætoria non tam ſtatuarum tabularumque pictarum ornatu quam rebus vetuſtate ac raritate notabilibus excoluit, qualia ſunt Capreis immanium belluarum ferarumque membra prægrandia, quæ dicuntur Gigantum oſſa. *Suetonius, Vita Auguſti*, c. 72.

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[*] Plin. lib. viii. cap. 16.

[†] The following extracts are taken from his defence when accuſed of ſorcery: Profiteor me quærere, non piſcatoribus modo, verum etiam amicis meis negocio dato, quicunque minus cogniti generis piſcis inciderit, ut ejus mihi aut formam commemorent, aut ipſum vivum, ſi id nequierint, vel mortuum oſtendant. - - - Dico, me de particulis omnium animalium, de ſitu earum deque numero, deque cauſa conſcribere, ac libros ανατομων Ariſtotelis et explorare ſtudeo et augere - - - Quæ alii de genitu animalium, deque particulis, deque omni differentia reliquerunt - - - - - ea Græce et Latine adnitar conſcribere, et in omnibus aut omiſſa anquirere, aut defecta ſupplere. *The object of his enquiries was*, noſſe, quanta ſit etiam in iſtis providentiæ ratio, non de diis immortalibus matri et patri credere. *This predeceſſor of Linnæus lived according to every appearance in the time of Antoninus.*

The principal cauſe why collections of natural curioſities were ſcarce in ancient times, muſt have been the ignorance of naturaliſts in regard to the proper means of preſerving ſuch bodies as ſoon ſpoil or corrupt. Some methods were indeed known and practiſed, but they were all defective and inferior to that by ſpirit of wine, which prevents putrefaction, and which by its perfect tranſparency permits the objects which are covered by it to be at all times viewed and examined. Theſe methods were the ſame as thoſe employed to preſerve proviſions, or the bodies of great men deceaſed. They were put into ſalt brine or honey, or were covered over with wax.

It appears that in the earlieſt periods bodies were preſerved from corrpution by means of ſalt *, and that this practice was long continued. We are told that Pharnaces cauſed the body of his father Mithridates to be depoſited in ſalt brine, in order

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* Salis natura, corpora adſtringens, ſiccans, alligans; defuncta etiam a putreſcendo vindicans, ut durent ita per ſæcula. *Plin.* lib. xxxi. cap. 9. The ſame thing is repeated by Iſiodorus in his *Origin.* lib. xvi. cap. ii. Nitre alſo was employed for the like purpoſe. *Plin.* lib. xxxi. cap. 10. *Herodot.* lib. ii. *Sextus Empiricus* in *Pyrrhon. hypotypoſ.* cap. 24. The laſt author aſcribes this cuſtom to the Perſians in particular.

that he might tranſmit it to Pompey *. Eunapius, who lived in the fifth century, relates that the monks preſerved the heads of the martyrs by means of ſalt †; and we are informed by Sigebert, who died in 1113, that a like proceſs was purſued with the body of St. Guibert, that it might be kept during a journey in ſummer ‡. In the ſame manner the prieſts preſerved the ſow which afforded a happy omen to Æneas, by having brought forth a litter of thirty pigs, as we are told by Varro, in whoſe time the animal was ſtill ſhewn at Lavinium ‖. A hippocentaur (probably a monſtrous birth), caught in Arabia, was brought alive to Egypt; and as it died there, it was, after being preſerved in ſalt brine, ſent to Rome to the emperor, and depoſited in his collection, where it was ſhewn in the time of Pliny,

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* Dion Caſſius, lib. xxxvii. cap. 14. Φαρνακης δε το τε σωμα αυτου τῳ Πομπηιῳ ταριχευσας, ελεγχον του πεπραγμενου, επεμψε. Pharnaces conditum muria corpus Mithridatis ad Pompeium miſit, tanquam rei geſtæ argumentum. See the Life of Pompey in Plutarch, who adds that the countenance of Mithidrates could no longer be diſtinguiſhed, becauſe the perſons who embalmed the body in this manner had forgotten to take out the brain: τον γαρ εγκεφαλον ελαθεν εκτηξαι τους θεραπευοντας.

Eunapius in Ædeſio.

‡ Sigebertus in Acta ſancti Guiberti, cap. 6.

‖ Hujus ſuis ac porcorum etiam nunc veſtigia apparent Lavinii, quod et ſimulacra eorum ahenea etiam nunc in publico poſita, et corpus matris ab ſacerdotibus, quod in ſalſura fuerit, demonſtratur. *Varro de re ruſtica*, lib. ii. cap. 4.

and in that of Phlegon *. Another hippocentaur was preſerved by the like method, and tranſmitted to the emperor Conſtantine at Antioch †; and a large ape of the ſpecies called Pan, ſent by the Indians to the emperor Conſtantius, happening to die on the road by being ſhut up in a cage, was placed in ſalt, and in that manner conveyed to Conſtantinople ‡. This method of preſerving natural objects has been even employed in modern times to prevent large bodies from being affected by corruption. The hippopotamus deſcribed by Columna was ſent to him from Egypt preſerved in ſalt ||.

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* Phlegon Trallian. de mirabil. cap. 34, 35; adopts in his account the ſame expreſſion as that uſed in the *Geoponica*, lib. xix. cap. 9, reſpecting the preſervation of the fleſh. Pliny however ſays, b. vii. cap. 3, Nos principatu Claudii Cæſaris allatum illi ex Ægypto hippocentaurum in melle vidimus.—Perhaps it was placed in honey after its arrival at Rome, in order that it might be better preſerved.

† Jerome, in the Life of Paul the Hermit, after deſcribing a hippocentaur, ſays, Hoc ne cuiquam ob incredulitatem ſcrupulum moveat, ſub rege Conſtantino, univerſo mundo teſte defenditur. Nam Alexandriam iſtiuſmodi homo vivus perductus, magnum populo ſpectaculum præbuit; et poſtea cadaver exanime, ne calore æſtatis diſſiparetur, ſale infuſo Antiochiam, ut ab imperatore videretur, allatum eſt.

‡ Philoſtorgii Hiſtoria eccleſiaſtica, edit. Gothofredi, Genevæ 1643, 4to. p. 41.

|| Columnæ Aquatil. et terreſtr. obſervat. cap. 15. Raius, Synopſ. quadrup. p. 123.

To put dead bodies in honey, for the purpoſe of ſecuring them from putrefaction, is an ancient practice [*], and was uſed at an early period by the Aſſyrians [†]. The body of Ageſipolis king of Sparta, who died in Macedonia, was ſent home in honey [‡], as were alſo the bodies of Ageſilaus [||] and Ariſtobulus [§]. The faithleſs Cleomenes cauſed the head of Archonides to be put in honey, and had it always placed near him when he was deliberating upon any affair of great importance, in order to fulfil the oath he had made to undertake nothing without conſulting his head [¶]. According to the account of ſome authors, the body of Alexander the Great was depoſited in honey *, though others relate that it was embalmed according to the manner of the Egyptians †. The body of the emperor Juſtin II was alſo placed in honey mixed with ſpices ‡. The wiſh of Democritus to be buried in honey ‖ is likewiſe a confirmation of this practice. Honey was often applied in ancient times to purpoſes for which we uſe ſugar. It was employed for preſerving fruit §; and this proceſs is not diſuſed at preſent ¶. In order to preſerve

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[*] Mellis natura eſt, ut putreſcere corpora non ſinat. *Plin.* lib. xxii. cap. 24.

[†] Strabo, lib. xvi. Θαπτουσι δ'εν μελιτι κηρῳ περιπλασαντες. Sepeliunt in melle, cera cadavere oblito.

[‡] Εκεινος μεν εν μελιτι τιθεις. In melle poſitus domum relatus eſt, regiaque illi contigit ſepultura. *Xenophon*, *Rerum Græc.* lib. v. p. 384. edit. Baſiliæ 1555. fol.

[||] Diodorus Siculus, lib. xv.

[§] Joſephi Antiq. Judaic. lib. xiv. cap. 13. De Bello Jud. lib. i. cap. 7.

[¶] Cleomenes Lacon, aſſumpto uno ex familiaribus ſuis, Archonide, eum conſortem et adjutorem ſui propoſiti fecit. Juravit igitur ei, ſi voti compos fieret, ſe omnia cum ipſius capite tranſacturum eſſe. Quum vero potitus rerum eſſet, occiſo ſocio, caput ejus reſectum vaſi pleno mellis impoſuit: et quotieſcunque aliquid agere inſtituiſſet, ad id inclinatus propoſitum narrabat: dicens, ſe pactum non violare, neque jusjurandum fallere: etenim conſilium ſe cum Archonidis capite capere. *Æliani Var. hiſt.* lib. xii. cap. 8.

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* Duc et ad Hemathios manes, ubi belliger urbis
Conditor Hyblæo perfuſus nectare durat.
STATIUS, Silv. iii. 2.

† Curtius, lib. x. cap. 10.

‡ Thura Sabæa cremant, fragrantia mella locatis
Infundunt pateris, et odoro balſama ſucco,
Centum aliæ ſpecies unguentaque mira teruntur,
Tempus in æternum ſacrum ſervantia corpus.
CORIPPUS de laudibus Juſtini II.

‖ Quare Heraclides Ponticus plus ſapit, qui præcepit ut comburerent, quam Democritus, qui ut in melle ſervarent; quem ſi vulgus ſequutus eſſet, peream, ſi centum denariis calicem mulſi emere poſſemus. *Varro, in Nonius*, cap. iii. The following words of Lucretius, b. iii. ver. 902, *aut in melle ſitum ſuffocari*, allude perhaps to the above circumſtance.

§ Columella, xii. 45: Tunc quam optimo et liquidiſſimo melle vas uſque ad ſummum ita repleatur, ut pomum ſubmerſum ſit.—Apicii Ars coquinar. lib. i. cap. 20.

¶ Krunitz, Œkonom. encyclop. v. p. 489, and xxv. p. 30.

freſh

freſh for many years the celebrated purple dye of the ancients, honey was poured over it *, and certain worms uſeful in medicine were kept free from corruption by the like means †. By the ſame method alſo were natural curioſities preſerved, ſuch as the hippocentaur already mentioned; and it has been employed in later times, as is proved by the account given by Alexander ab Alexandro ‡, reſpecting the ſuppoſed mer-men.

Among the Scythians ‖, Aſſyrians §, and Perſians ¶, dead bodies were covered over with wax. That of Ageſilaus, becauſe honey could not be

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* Plutarch in the Life of Alexander relates, that among other valuables in the treaſury at Suſa, that conqueror found 5000 talents of the purple dye, which was perfectly freſh, though nearly two hundred years old, and that its preſervation was aſcribed to its being covered with honey. This account is well illuſtrated in *Mercurialis Var. lect.* lib. vi. cap. 26.

† Multa et alia ex his remedia ſunt, propter quæ in melle ſervantur. *Plin.* lib. xxix. cap. 4.

‡ Alexandri ab Alexan. Dier. genial. lib. iii. cap. 8.

‖ Herodot. lib. iv. cap. 71. τον νεκρον κατακεκηρωμενον μεν το σωμα.

§ Θαπτουσι δ'εν μελιτι, κηρω περιπλασαντες. Sepeliunt in melle, cera cadavere oblito. The bodies therefore were firſt covered with wax, and then depoſited in honey.

¶ Herodot. lib. i. cap. 140. Κατακηρωσαντες δη ων τον νεκυν Περσαι γη κρυπτουσι. Perſæ mortuum cera circumlinentes in terram condunt. Cicero, at the end of the firſt book of his Tuſculan Queſtions, ſays: Perſæ etiam cera circumlitos mortuos condiunt, ut quam maxime permaneant diuturna corpora. *Alexandri ab Alexan. Dier. genial.* lib. iii, cap. 2.

procured, was preſerved in this manner *, which indeed ought not to be deſpiſed even at preſent. When the Orientals are deſirous of tranſporting fiſh to any diſtance, they cover them over with wax †; and the apples which are every year carried to the northern parts of Siberia and Archangel are firſt dipped in melted wax, which, by forming a thick coat around them, keeps out the air, and prevents them from ſpoiling. This property has in my opinion given riſe to the ancient cuſtom of wrapping up in wax-cloth the dead bodies of perſons of diſtinction. Linen, or perhaps ſilk, which had been done over with wax, was uſed on ſuch occaſions, but not what we at preſent

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* Ibi eum amici, quo Spartam facilius perferre poſſent, quod mel non habebant, cera circumfuderunt, atque ita domum retulerunt. *Cornel. Nep. Vita Ageſilai*, cap. 8. Οι παροντες Σπαρτιαται κηρον επιτηξαντες τῳ νεκρῳ, μελιτος ου παροντος, απηγον εις Λακεδαιμονα. Comites Ageſilai Spartiatæ mellis penuria cadaver ejus cera conditum Lacedæmonem reportarunt. *Plutarchus in Vita Ageſilai.*

The following paſſage of Quintilian's *Inſtitut. Orat.* b. vi. cap. 1. 40. is underſtood by moſt commentators, as if the author meant to ſay that a waxen image of the perſon deceaſed, made by pouring the wax into a mould of gypſum, was exhibited. "Et prolata noviſſime, deformitate ipſa (nam ceris cadaver attulerant infuſum) præteritam quoque orationis gratiam perdidit." See *Turnebi Adverſar.* lib. xxix. cap. 13. But in my opinion it appears very probable that the body itſelf, covered with wax, was carried into the court.

† Near Damietta are found a kind of mullets, which, after being covered over with wax, are by theſe means ſent throughout all Turkey, and to different parts of Europe. *Pocock's Travels.*

diſtinguiſh by the name of wax-cloth, which is only covered with an oil-varniſh in imitation of the real kind. The body of St. Anſbert, we are told, was wrapped up *linteo cerato*; and a *camiſale ceratum* * was drawn over the clothes which covered that of St. Udalric. When Philip duke of Burgundy died in 1404, his body was wrapped up in thirty-two ells *de toile cirée* †. In an ancient record, reſpecting the ceremonial to be uſed in burying the kings of England, it is ordered that the body ſhall be wrapped up in wax-cloth ‡. In the year 1774, when the grave of king Edward I, who died in 1307, was opened, the body was found ſo cloſely wrapped up in wax-cloth, that one could perfectly diſtinguiſh the form of the hand, and the features of the countenance ||. The body of Johanna, mother of Edward the Black Prince, who died in 1359, was alſo wrapped up in *cerecloth*; and in

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* Theophilus Raynaudus de incorruptione cadaverum, in the thirteenth volume of the works of that Jeſuit, printed at Lyons in 1665, fol. p. 40.

† Deſcription du duché de Bourgogne, par Beguillet, vol. i, p. 192.

‡ Liber regalis, *in the article* de exequiis regalibus: Corpus in panno lineo cerato involvitur; ita tamen quod facies et barba illius tantum pateant. Et circa manus et digitos ipſius, dictus pannus ceratus ita erit diſpoſitus, ut quilibet digitus, cum pollice utriuſque manus, ſingillatim inſuatur per ſe; ac ſi manus ejus chirothecis lineis eſſent coopertæ.

|| Archæologia, or Miſcellaneous tracts relating to antiquity, vol. iii. p. 376.

like manner the body of Elizabeth Tudor, the ſecond daughter of Henry II, was *cered by the wax-chandler* [*]. After the death of George II, the apothecary was allowed one hundred and fifty-two pounds for fine double wax-cloth, and other articles neceſſary to embalm the body [†]. The books found in the grave of Numa, as we learn from the Roman hiſtorians, though they had been buried more than five hundred years, were, when taken up, ſo entire, that they looked as if perfectly new, becauſe they had been cloſely ſurrounded with wax-candles. Wax-cloth it is probable was not then known at Rome [‡].

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[*] Dart's Antiquities of Weſtminſter, vol. ii. p. 28.

[†] In the account of the funeral expences ſtands the following article: To Thomas Graham, apothecary to his majeſty, for a fine double cerecloth, with a large quantity of very rich perfumed aromatic powders, &c. for embalming his late majeſty's royal body, 152 l. See *Archæologia* ut ſupra, p. 402.

[‡] Livius, lib. xl. cap. 29. In altera arca duo faſces, candelis involuti, ſeptenos habuere libros, non integros modo, ſed recentiſſima ſpecie. Pliny, b. xiii. chap. 13, relates the ſame thing with a little variation reſpecting the annals of Caſſius Hemina: Mirabantur alii, quomodo illi libri durare potuiſſent. Ille ita rationem reddebat: lapidem fuiſſe quadratum circiter in media arca vinctum candelis quoquoverſus. In eo lapide inſuper libros impoſitos fuiſſe, propterea arbitrari eos non computruiſſe. Et libros citratos fuiſſe, propterea arbitrarier tineas non tetigiſſe.—Harduin thinks that *libri citrati* were books in which *folia citri* were placed to preſerve them from inſects. The firſt editions however have

In thoſe centuries which we uſually call the middle ages, I find no traces of collections of this nature, except in the treaſuries of emperors, kings and princes, where, beſides articles of great value, curioſities of art, antiquities and relics, one ſometimes found ſcarce and ſingular foreign animals, which were dried and preſerved. Such objects were to be ſeen in the old treaſury at Vienna; and in that of St. Denis was exhibited the claw of a griffin, ſent by a king of Perſia to Charlemagne; the teeth of the hippopotamus, and other things of the like kind *. In theſe collections the number of the rarities always increaſed in proportion as a taſte for natural hiſtory became more prevalent, and as the extenſion of commerce afforded better opportunities for procuring the productions of remote countries. Menageries were eſtabliſhed to add to the magnificence of courts, and the ſtuffed ſkins of rare animals were hung up as memorials of their having exiſted. Public libraries alſo were made receptacles for ſuch natural curioſities as were from time to time preſented to them; and as

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have *libri cedrati*, and even the paper itſelf may have been covered over with ſome reſinous ſubſtance. The ſcarce edition which I received as a preſent from profeſſor Bauſe at Moſcow: *Opus impreſſum per Joan. Rubeum et Bernardinum Fratreſque Vercellenſes* 1507, fol. has in page 98 the word *caedratos*, and in the margin *caeratos*.

* A catalogue of this collection may be found in the ſecond volume of Valentin's *Muſeum muſeorum*.

in univerſities the faculty of medicine had a hall appropriated for the diſſection of human bodies, curioſities from the animal kingdom were collected there alſo by degrees; and it is probable that the profeſſors of anatomy firſt made attempts to preſerve different parts of animals in ſpirit of wine, as they were obliged to keep them by them for the uſe of their ſcholars; and becauſe in old times dead bodies were not given up to them as at preſent, and were more difficult to be obtained.

At a later period collections of natural curioſities began to be formed by private perſons. The object of them at firſt appears to have been rather to gratify the ſight than to improve the underſtanding; and they contained more rarities of art, valuable pieces of workmanſhip and antiquities, than productions of nature *. It is certain that ſuch collections were firſt made in places where many families had been enriched without much labour by trade and manufactures, and who, it is likely, might wiſh to procure to themſelves conſequence and reſpect by expending money in this manner. It is not improbable that ſuch collections were formed, though not firſt, as Mr. Stetten thinks †, at a very early period at Augſburg, and this taſte was ſoon ſpread into other opulent cities and ſtates.

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* Von Stettens Kunſtgeſchichte von Augſburg, p. 218.

† Ut ſupra, p. 362.

Private collections, however, appear for the firſt time in the ſixteenth century; and there is no doubt that they were formed by every learned man who at that period applied to the ſtudy of natural hiſtory. Among theſe were Hen. Cor. Agrippa of Netteſheim *; Nic. Monardes, Paracelſus, Val. Cordus †, Hier. Cardan, Matthiolus 1577, Conrade Geſner, George Agricola 1555 ‡; Pet. Bellon 1564; W. Ron-

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* Of H. C. Agrippa a good account may be found in the *Colniſchen Wochenblatte* 1788, p. 121.

† With how much care this learned man, who died in 1544 in the twenty-ninth year of his age, collected minerals and plants is proved by his *Silva obſervationum variarum, quas inter peregrinandum breviſſime notavit*. Walch, in his *Naturgeſchichte der verſteinerungen,* conſiders it as the firſt general oryctography of Germany, and is ſurpriſed that ſo extenſive a work ſhould have been thought of at that period. Wallerius, in his *Lucubratio de ſyſtematibus mineralogicis*, Holmiæ 1768, 8vo. p. 27, conſiders this *Silva* as a ſyſtematic deſcription of all minerals. Both however are miſtaken. Cordus undertook a journey in 1542, through ſome parts of Germany, and drew up a ſhort catalogue without order, of the natural objects which he met with in the courſe of his travels, which was publiſhed by Conrade Geſner, together with the other works of this induſtrious man, at Straſburgh in 1561. This book, which I have in my poſſeſſion, has in the title page: *In hoc volumine continetur Valerii Cordi in Dioſcoridis libros de medica materia; ejuſdem hiſtoria ſtirpium*, &c. The *Silva* begins page 217.

‡ That Agricola had a good collection, may be concluded from his writings, in which he deſcribes minerals according to their external appearance, and mentions the places where they are found. He ſays likewiſe himſelf in the preface to his book *de natura*

W. Rondelet 1566; Thurneiſſer[*]; Abraham Ortelius 1598[†]; and many others. That ſuch collections were formed alſo in England during the above century, is proved by the catalogue which Hakluyt uſed for his works[‡].

The oldeſt catalogues of private collections which I remember, are the following: Samuel Quickelberg, a phyſician from Antwerp, who about the year 1553 reſided at Ingolſtadt, and was much eſteemed by the duke of Bavaria, publiſhed

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natura foſſilium, page 168: Sed cum noſtræ venæ non gignant omnis generis res foſſiles, eas quæ nobis deſunt non modo a Germaniæ regionibus quæ iis abundant, verum ab omnibus ferme Europæ, a quibuſdrm Aſiæ et Afticæ, apportandas curavi. In quibus negociis conficiendis mihi et docti homines et mercatores et metallici operam navarunt. The learned men who aſſiſted him are named in the preface to *Rerum metallicarum interpretatio*, page 469. Both theſe works are printed in the folio collection publiſhed at Baſle in 1546.

[*] H. Mohſen ſays in his *Beytragen zur geſchichte der wiſſenſchaften in Mark Brandenburg*, Berlin 1783, 4to. p. 142, Thurneiſſer is the firſt perſon, as far as is known at preſent, who in this country formed a collection of natural curioſities.

[†] Ortelius habebat domi ſuæ imagines, ſtatuas, nummos, - - - conchas ab ipſis Indis et Antipodibus, marmora omnis coloris, ſpiras teſtudineas tantæ magnitudinis, ut decem ex iis viri in orbem ſedentes cibum ſumere poſſent; alias rurſum ita anguſtas, ut vix magnitudinem capitelli unius aciculi adæquarent. *M. Adami Vitæ Germanorum philoſophorum.* Haidelbergæ 1615, 8vo. p. 431.

[‡] See Biographia Britannica, vol. iv. p. 2469.

in quarto at Munich in 1565: *Inſcriptiones vel tituli theatri ampliſſimi, complectentis rerum univerſitatis ſingulas materias et imagines.* This pamphlet contained only the plan of a large work, in which he intended to give a deſcription of all the rarities of nature and art. I have never had an opportunity of ſeeing it. I am acquainted only with a copious extract from it, which induces me to doubt whether Walch was right in giving it out as a catalogue of the author's collection *.

The ſame year, 1565, John Rentmann, a learned phyſician of Torgau, ſent a catalogue of his collection, which conſiſted principally of minerals and ſhells, to Conrade Geſner, who cauſed it to be printed †. The order obſerved in it is principally borrowed from Agricola. This collection, however, was not extenſive. It was contained in a cabinet compoſed of thirteen drawers, each of which was divided lengthwiſe into two partitions, and the number of the articles, among which, beſides minerals,

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* This extract may be ſeen in *D. G. Molleri Diſſert. de technophyſiotameis*, Altorfi 1704, p. 18. Some account of Quickelberg may be found in *Sweertii Athenæ Belgicæ*, Antverpiæ 1628, fol. p. 671; in Val. Andreæ Bibliotheca Belgica, Lovanii 1643, 4to. p. 806; and in Simleri Bibliotheca inſtituta a Geſnero, Tiguri, 1574, fol. p. 617. Moller writes the name Guiccheberg, and Walch in the place above quoted, p. 24, Quicheberg; but the firſt-mentioned authors call him Quickelberg or Quiccelberg.

† De omni rerum foſſilium genere libri aliquot, opera Conradi Geſneri. Tiguri 1565, 8vo.

nerals, there were various productions found in mines and marine bodies, amounted to about ſixteen hundred. It muſt however have been conſiderable for that period, as the collector tells us he laid out ſums in forming it which few could be able to expend *; and as Jacob Fabricius, in order to ſee it, undertook a journey from Chemnitz to Torgau †. About this time lived in France that ingenious and intelligent potter, Bernard Paliſſy, who collected all kinds of natural and artificial rarities, and publiſhed a catalogue of them, which he made his guide in the ſtudy of natural hiſtory ‡. Michael Mercati, a phyſician, who was cotemporary, formed alſo in Italy a large collection of natural curioſities, and wrote a very copious deſcription of them, which was firſt printed about the beginning of the preſent century ||. The collection of Ferdinand

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[*] He ſays in the preface: Theſaurum foſſilium multis impenſis collegi, paucis comparabilem.

[†] This is related by Jacob Fabricius, in the preface to the treatiſe of his brother George Fabricius *de metallicis rebus*, which may be found in Geſner's collection before quoted.

[‡] This catalogue is printed in Œuvres de B. Paliſſy. Par M. Faujas de Saint Fond et Gobet. Paris 1777, 4to. p. 691. Compare Phyſikal.-ökonom. Bibliothek, vol. viii. p. 311.

[||] Mercati Metallotheca. Romæ 1717, fol. When an appendix was publiſhed to the Metallotheca in 1719, the work received a new title-page, with the date of that year, and the following addition: Cui acceſſit appendix cum xix recens inventis iconibus. This, therefore, anſwers the queſtion propoſed in *Deliciæ Cobreſianæ*, page 108.

dinand Imperati, a Neapolitan, the deſcription of which was printed for the firſt time in 1599, belongs to the ſame period [*]; and likewiſe the large collection of Fran. Calceolari of Verona, the catalogue of which was firſt printed in 1584[†]. Walch and ſome others mention the catalogue of Brackenhoffer's collection as one of the earlieſt, but it was printed for the firſt time only in 1677[‡].

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[*] Halleri Bibliotheca botanica, vol. i. p. 393.

[†] Joh. Baptiſtæ Olivi de reconditis et præcipuis collectaneis a Franc. Calceolario in muſeo adſervatis teſtificatio ad Hieron. Mercurialem. Venet. 1584, 4to. An edition was publiſhed alſo at Verona in quarto, in 1593. The complete deſcription was however firſt printed at Verona in a ſmall folio, in 1622: *Muſæum Calceolarianum Veronenſe.* Maffei, in his *Verona illuſtrat.* Veron. 1732, fol. p. 202, ſays: Calceolari - - - - fu de' primi, che raccogliendo grandiſſima quantità d'erbe, piante, minerali, animali diſeccati, droghe rare, coſe impetrite, ed altre rarità naturali, formaſſe muſeo di queſto genere.

[‡] Of this catalogue I have given ſome account in *Phyſik.-ökonom. bibliothek*, vol. i. p. 83, to which I ſhall now add, that it is printed entire in *Valentini Muſeum muſeorum*, vol. ii. p. 69. The life of Elias Brackenhoffer may be found in *Hannoveriſchen Gelehrten anzeigen* 1752, p. 1190.

CHIMNEYS.

NOTWITHSTANDING the magnificence of the Grecian and Roman architecture, which we ſtill admire in thoſe ruins that remain as monuments of the talents and genius of the ancient builders, it is very doubtful whether their common dwelling-houſes had chimneys, that is, paſſages or funnels formed in the walls for conveying away the ſmoke from the fire-place or ſtoves through the different ſtories to the ſummit of the edifice; conveniencies which are not wanting in the meaneſt of our houſes at preſent, and in the ſmalleſt of our villages. This queſtion ſome have pretended to determine without much labour or reſearch. How can we ſuppoſe, ſay they, that the Romans, our maſters in the art of building, ſhould not have deviſed and invented ſome means to keep free from ſmoke their elegant habitations, which were furniſhed and ornamented in a ſplendid and coſtly manner? How is it poſſible that a people who purchaſed eaſe and convenience at the greateſt expence, ſhould ſuffer their apartments to be filled with ſmoke, which muſt have allowed them to enjoy ſcarcely a moment of pleaſure? And how could their cooks dreſs in ſmoky kitchens the various ſumptuous diſhes with which the moſt refined voluptuaries covered their tables? One muſt however be very little acquainted with the hiſtory of inventions and manners, to conſider ſuch bare conjectures as decisive proofs. It is undoubtedly certain, that many of our common neceſſaries were for many centuries unknown to the moſt enlightened nations, and that they are in part ſtill wanting in ſome countries at preſent. Beſides, it is probable, that before the invention of chimneys, other means, now forgotten, were employed to remove ſmoke.

The ancient maſon-work ſtill to be found in Italy does not determine the queſtion. Of the walls of towns, temples, amphitheatres, baths, aqueducts and bridges, there are ſome though very imperfect remains, in which chimneys cannot be expected; but of common dwelling-houſes none are to be ſeen, except at Herculaneum, and there no traces of chimneys have been diſcovered *. The paintings and pieces of ſculpture which are preſerved, afford us as little information; for nothing can be perceived in them that bears the ſmalleſt reſemblance to a modern chimney. If the writings of the ancients are to be referred to, we muſt collect from the works of the Greek and Roman authors, whatever ſeems alluſive to the ſubject. This indeed has been already done by various

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* Winkelmann in his Obſervations on the baths of the ancients.

men of learning*; but the greater part of them ſeem to deduce more from the paſſages they quote than can be admitted by thoſe who read and examine

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* The following are the principal authors in whoſe works information is to be found reſpecting this ſubject:—*Octavii Ferrarii Electorum libri duo.* Patavii 1679, 4to. This work conſiſts of ſhort treatiſes on different ſubjects of antiquity. The ninth chapter of the firſt book, page 32, has for title: *Fumaria, ſeu fumi emiſſaria, vulgo caminos, apud veteres in uſu fuiſſe, diſputatur.*

Juſti Lipſii Epiſtolarum ſelectarum chilias, 1613, 8vo. The place where printed not mentioned. The ſeventy-fifth letter in *Centuria tertia ad Belgas*, page 921, treats of chimneys, with which the author ſays the Greeks and the Romans were unacquainted.

Eberharti a Weyhe Parergon de camino. To ſave my readers the trouble which I have had in ſearching for this ſmall treatiſe, I ſhall give them the following information: E. von Weyhe was a learned nobleman of our electorate, a particular account of whoſe life and writings may be found in *Molleri Cimbria litterata*, vol. ii. p. 970. In the year 1612 he publiſhed *Diſcurſus de ſpeculi origine, uſu et abuſu, Eberharti von Weyhe*, Hagæ Schaumburgicorum. This edition, which was not printed at Brunſwick, as Moller ſays, contains nothing on chimneys, nor is there any thing to be found reſpecting them in the ſecond inſerted in *Caſp. Dornavii Amphitheatrum ſapientiæ Socraticæ joco-ſeriæ*, Hanoviæ 1619, fol. i. p. 733. But this treatiſe was twice printed afterwards, as an appendix to the author's *Aulicus politicus*: at Francfort in 1615, and Wolfenbuttle 1622, both times in quarto; and in both theſe editions, with the laſt of which Moller was not acquainted, may be found, at the end, *Parergon de camino, inquirendi cauſa adjectum.* In this ſhort eſſay, which conſiſts of only two pages, the author denies that the Jews, the Greeks or the Romans had chimneys. Fabricius in his *Bibliograph. antiquaria* amine them without prejudice. I ſhall here preſent them to my readers, that they may have an opportunity of judging for themſelves.

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does not quote von Weyhe, either p. 1004, where he ſpeaks of chimneys, or page 1014, where he ſpeaks of looking-glaſſes.

Balthaſaris Bonifacii Ludicra hiſtoria. Venetiis 1652, 4to. lib. iii. cap. 23. *de caminis*, p. 109. This work is of little importance.

Johannis Heringii Tractatus de molendinis eorumque jure, Francofurti 1663, 4to. In the *mantiſſa*, p. 137, *de caminis.*

Pauli Manutii Commentar. in Ciceronis epiſt. familiar. lib. vii. epiſt. 10, decides againſt chimneys, and ſpeaks of the manner of warming apartments.

Petronii Satyricon, curante P. Burmanno, Amſtelædami 1743, 4to. vol. i. p. 836. Burmann, on good grounds, is of opinion, that the ancients had not chimneys.

Mat. Martini Lexicon philologicum. Francofurti 1655, fol. under the article *Caminus.*

Pancirollus de rebus deperditis, edit. Salmuth. vol. i. tit. 33. p. 77.

L'antiquité expliquée, par Bernard de Montfaucon, première partie, page 102. Montfaucon believes that the ancients had chimneys.

Sam. Pitiſci Lexicon antiquitatum Romanarum, Leovardiæ 1713, 2 vol. fol. i. pag. 335. The whole article *caminus* is tranſcribed from Lipſius, Ferrarius, and others, without the author's own opinion.

Antiquitates Italiæ medii ævi, auctore Muratorio, tom. ii. diſſert. 25. p. 418.

Conſtantini Libri de ceremoniis aulæ Byzantinæ, tomus ſecundus, Lipſiæ 1754, fol. *in Reiſkii Commentar.* p. 125.

Encyclopédie, tome troiſième, Paris 1753, fol. p. 281.

Deutſche Encyclopedie, vierter band, Frankfurt 1780, 4to. p. 823.

Maternus

We are told by Homer, that Ulyſſes, when in the grotto of Calypſo, wiſhed that he might ſee the ſmoke aſcending from Ithaca, that is, he wiſhed to be in ſight of the iſland *. Montfaucon is of opinion that this wiſh is unintelligible unleſs it be allowed that the houſes of Ithaca had chimneys. But cannot one ſee ſmoke riſe alſo when it makes its way through doors and windows? When navigators at ſea obſerve ſmoke to ariſe, they conclude that they are in the neighbourhood of inhabited land; but no one undoubtedly will thence infer, that the habitations of the people have chimneys.

Herodotus † relates that a king of Libya, when

Maternus von Cilano, Abhandlung der Römiſchen alterthümer, vierter theil, Altona 1776, 8vo. p. 945. This author is of opinion that chimneys were uſed by the Greeks, but not by the Romans.

Bibliotheque ancienne et moderne, par Jean le Clerc, tom. xiii. pour l' année 1720, part. i. p. 56. The author gives an extract from Montfaucon, which contains a great many new obſervations.

Dell' origine di alcune arti principali appreſſo i Veneziani. Venezia 1758, 4to. p. 78. This work is the production of Girolamo Zanetti.

Raccolta d'opuſcoli ſcientifici e filologici. Venezia 1752, 12mo. tom. xlvii. A treatiſe on chimneys by Scip. Maffei is to be found page 67.

— — — — — αυταρ [illegible] σσευς
Ιεμενος και καπνον αποθρωσκο [illegible] ησαι
Ης γαιης. Odyſſ. lib. i. ver. 58.

† Κατα την καπνοδοκην ες τον οικον εσιχωι ὁ ἥλιος. Lib. viii. c. 137.

one of his ſervants aſked for his wages, offered him in jeſt the ſun, which at that time ſhone into the houſe through the chimney, as ſome have tranſlated the original; but it appears that what is here called chimney, was nothing more than an opening in the roof, under which, perhaps, the fire was made in the middle of the edifice. Through a high chimney, of the form of thoſe uſed at preſent, the ſun certainly could not throw his rays on the floor of any apartment.

In the *Veſpæ* of Ariſtophanes [*], old Philocleon wiſhes to eſcape through the kitchen. Some one aſks, "What is that which makes a noiſe in the "chimney?" "I am the ſmoke," replies the old man, "and am endeavouring to get out at the "chimney." This paſſage, however, which, according to the uſual tranſlation, ſeems to allude to a common chimney, can, in my opinion, eſpecially when we conſider the illuſtration of the ſcholiaſts [†], be explained alſo by a ſimple hole in the roof, as Reiſke has determined; and indeed this appears to be more probable, as we find mention made of a top or covering * with which the hole was cloſed.

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[*] Ariſtop. in Veſpis, ver. 139. Ὁ γαρ πατηρ εις τον ιπνον εισεληλυθε, Pater ingreſſus eſt furnum - - - Τι ποτ' αρ η καπνη ψοφει; quid inſtrepit fumarium? Καπνος· εγωγ' εξερχομαι. Fumus; egreſſum aucupo.

[†] The ſcholiaſt explains καπνη by καπνοδοχη. Εστι δε σωληνοειδης επι των μαγειρειων: fumi receptaculum inſtar tubi, ſeu canalis, ſuper culinam. The ſcholiaſt here undoubtedly mentions a chimney. But in what century did he live?

In a paſſage of the poet Alexis, who lived in the time of Alexander the Great, quoted by Athenæus †, ſome one aſks, “ Boy, is there a kitchen? Has it a chimney?”—“ Yes, but it is a bad one—“ the eyes will ſuffer.” The queſtion here alludes without doubt to a paſſage for carrying off ſmoke; but information is not given us ſufficient to determine its form and conſtruction. Athenæus has preſerved alſo a paſſage of the poet Diphilus ‡, in which a paraſite ſays, when he is invited to the houſe of a rich man, he does not look at the magnificence of the building, or the elegance of the furniture, but to the ſmoke of the kitchen. “ If I “ ſee it,” adds he, “ riſing up in abundance, quick “ and in a ſtraight column, my heart is rejoiced, “ for I expect a good ſupper.” In this paſſage, however, which according to Maternus is clearly in favour of chimneys, I can find as little proof as in the words of the poet Soſipater, quoted likewiſe

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* Τηλια.

† Παιδες, οπτανειον εϛιν; εϛι, και καπνην εχει. - - - αλλ' εχει καπνην, εχει κακον. Athen. lib. ix. p. 386.

‡ Ατενες δε τηρω του μαγειρου τον καπνον. Intentis oculis aſpicio coqui fumum. Si directo impetu vehemens excurrit, gaudeo, lætor, exulto; ſin obliquus et tenuis, animadverto protinus illam mihi futuram cœnam abſque ſanguine. *Athenæus*, lib. vi. p. 236.

by Athenæus *, who reckons the art of determining which way the wind blows to be a part of the knowledge requiſite in a perfect cook. "He muſt "know," ſays he, "to diſcover from what quarter it comes, for when the ſmoke is driven about "it ſpoils many kinds of diſhes." Inſtead of agreeing with Ferrarius that this quotation ſeems to ſhew that the houſes of the ancients were provided with chimneys, I conclude rather from it, that they were not; for, had there been chimneys in their kitchens, the cooks muſt have left the ſmoke to make its way through them without giving themſelves any trouble; but if they were deſtitute of theſe conveniencies, it would be neceſſary for them to afford it ſome other paſſage; it would conſequently be the buſineſs of the cook, to conſider on what ſide it would be moſt advantageous to open a door or a window; and in this he would undoubtedly be guided by the direction of the wind. That this really was the caſe, appears from a Greek epigram, which, by an ingenious thought, gives us an idea of the paſſage of ſmoke through a window †.

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* Culinam recte ſtatui, et lucis accipere quod ſatis eſt, ac unde ventus aſpiret contemplari, præbet ad hoc utilitatis plurimum. Fumus enim huc illuc jactatus, diſcrimen aliquod afferre interdum ſolet dum coquuntur obſonia. *Athenæus*, lib. ix. p. 378.

† Τον λεπτον φυσωντα το πυρ Προκλον ηρεν ὁ καπνος,
Και δια θυριδων ενθεν απηλθεν εχων;
Αλλα μολις νεφελη προσενηξατο και δι εκεινης
Προσκατεβη τρωθεις μύρια ταις ατομοις.

Proclum

Theſe, as far as I know, are all the paſſages which have been collected from Greek authors reſpecting this queſtion. But inſtead of proving that the houſes of the ancients were built with chimneys, they ſeem to ſhew much rather the contrary: eſpecially when we conſider what the Roman writers have ſaid on the ſame ſubject; for the information of the latter, taken together, affords good grounds to believe that no chimneys were to be found in the houſes at Rome, at leaſt at the time when theſe authors wrote; and this certainly would not have been the caſe had the Romans ever ſeen chimneys among the Greeks. I ſhall now lay before my readers thoſe paſſages which appear on the firſt view to refute my conjecture.

When the triumviri, ſays Appian *, cauſed thoſe who had been proſcribed by them to be ſought for by the military, ſome of them, to avoid the bloody hands of their perſecutors, hid themſelves in wells, and others, as Ferrarius tranſlates the words, *in fumaria ſub tecto, qua ſcilicet fumus e tecto evolvitur* †. The true tanſlation, however, is *fu-*

Proclum tenuem ſufflantem ignem fumus rapuit,
Et per feneſtellas abiit in aera,
Ubi cum vix per nubes deſcendiſſet,
Vulneribus millibus ab atomis eſt affectus.

Antholog. lib. ii. cap. 32. p. 229.

[*] De bellis civil. lib. iv. p. 962. edit. Tollii.

[†] Ες καπνωδεις υπωροφιά; η των τεγων ταις κεραμισι βυομεναις.

moſa cœnacula. The principal perſons of Rome endeavoured to conceal themſelves in the ſmoky apartments of the upper ſtory under the roof, which, in general, were inhabited only by poor people; and this ſeems to be confirmed by what Juvenal * expreſsly ſays, *Rarus venit in cœnacula miles.*

Thoſe paſſages of the ancients which ſpeak of ſmoke riſing up from houſes have with equal impropriety been ſuppoſed to allude to chimneys, as if the ſmoke could not make its way through doors and windows. Seneca † writes: "Laſt evening "I had ſome friends with me, and on that account "a ſtronger ſmoke was raiſed; not ſuch a ſmoke, "however, as burſts forth from the kitchens of "the great, and which alarms the watchmen, but "ſuch a one as ſignifies that gueſts are arrived." Thoſe whoſe judgments are not already warped by prejudice, will undoubtedly find the true ſenſe of theſe words to be, that the ſmoke forced its way through the kitchen windows. Had the houſes been built with chimney-funnels, one cannot conceive why the watchmen ſhould have been alarmed when they obſerved a ſtronger ſmoke than uſual ariſing from them; but as the kitchens had no conveniencies of that nature, an apprehenſion of fire, when extraordinary entertainments were to be provided in the houſes of the rich for large companies, ſeems to have been well founded; and on ſuch occaſions people appointed for that purpoſe were ſtationed in the neighbourhood to be conſtantly on the watch, and to be ready to extinguiſh the flames in caſe a fire ſhould happen *. There are many other paſſages to be found in Roman authors of the like kind, which it is hardly neceſſary to mention, ſuch as that of Virgil †:

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* Sat. x. ver. 17.

† Intervenerunt quidam amici, propter quos major fumus fieret; non hic qui erumpere ex lautorum culinis, et terrere vigiles ſolet, ſed hic modicus qui hoſpites veniſſe ſignificaret. *Epiſt.* 64.

> Et jam ſumma procul villarum culmina fumant.

and the following words of Plautus ‡ deſcriptive of a miſer:

> Quin divûm atque hominum clamat continuo fidem,
> Suam rem periiſſe, ſeque eradicarier,
> De ſuo tigillo fumus ſi qua exit foras.

If there were no funnels in the houſes of the an-

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* Such fire-watchmen were appointed by the emperor Auguſtus: Adverſus incendia excubias nocturnas vigileſque commentus eſt. *Sueton. in Vit. Octav. Auguſt.* cap. 30. That theſe watchmen, whom the ſoldiers through ridicule called *Sparteoli*, were ſtationed in the neighbourhood of houſes where there were grand entertainments, is proved by *Tertulliani Apologet.* cap. xxxix. p. 188, edit. De la Cerda. Compare alſo Caſaubon's annotations on the paſſage of Suetonius above quoted.

† Eclog. i. ver. 83.

‡ Aulular. act. ii. ſc. 4.

cients to carry off the ſmoke, the directions given by Columella to make kitchens ſo high that the roof ſhould not catch fire, was of the utmoſt importance *. An accident of the kind, which that author ſeems to have apprehended, had almoſt happened at Beneventum, when the landlord who entertained Mæcenas and his company was making a ſtrong fire in order to get ſome birds ſooner roaſted:

> — — — — ubi ſedulus hoſpes
> Pæne arſit, macros dum turdos verſat in igne;
> Nam vaga per veterem dilapſo flamma culinam
> Vulcano ſummum properabat lambere tectum †.

Had there been chimneys in the Roman houſes, Vitruvius certainly would not have failed to deſcribe their conſtruction, which is ſometimes attended with conſiderable difficulties, and which is intimately connected with the regulation of the plan of the whole edifice. He does not, however, ſay a word on this ſubject; neither does Julius Pollux, who has collected with great care the Greek names of every part of a dwelling-houſe; and Grapaldus, who in latter times made a like collection of the Latin terms, has not given a Latin word expreſſive of a modern chimney ‡.

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* At in ruſtica parte, magna et alta culina ponatur, ut et contignatio careat incendii periculo, et in ea commode familiares omni tempore anni morari queant. *De re ruſtica*, lib. i. cap. 6.

† Horat. lib. i. ſat. 5.

‡ Franciſci Marii Grapaldi de partibus ædium libri.

I ſhall here anſwer an objection which may be made, that the word *caminus* means a chimney; and I ſhall alſo explain what methods the ancients, and particularly the Romans, employed without chimneys to warm their apartments. *Caminus* ſignified, as far as I have been able to learn, firſt a chemical or metallurgic furnace, in which a crucible was placed for melting and refining metals. It ſignified alſo a ſmith's forge *. It ſignified likewiſe, without doubt, a hearth, or, as we talk at preſent, a chimney, which ſerved for warming the apartment in which it was conſtructed; and for that purpoſe portable ſtoves or fire-pans were alſo employed. Theſe were either filled with burning coals, or wood was lighted in them, and, when burned to coal, was carried into the apartment. In all theſe, however, there appears no trace of a chimney.

The complaints often made by the ancients reſpecting ſmoke ſerve alſo to confirm the opinion that they had no chimneys. Vitruvius †, where he ſpeaks of ornamenting and fitting-up apartments, ſays expreſsly, that there ought to be no carved work or mouldings, but plain cornices, in rooms where fire is made and many lights burned, becauſe they will ſoon be covered with ſoot, and will therefore require to be often cleaned. On the other hand, he allows carving in ſummer apartments, where the effects of ſmoke are not to be apprehended. The moderns, however, who uſe chimneys, ornament the borders of them with carving, painting and gilding, nor are they injured by the ſmoke; but we find that among the ancients, furniture of every kind, ceilings and walls were ſoon covered over with ſoot; and from this even the images of their anceſtors, *imagines majorum*, were not ſecure, which, though they were to be found only in the houſes of the great, and ſtood in niches in the *atrium*[*] or hall, became black with ſmoke, and

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* Plin. Hiſt. nat. lib. xxxiii. cap. 4. Virgil. Æn. lib. iii. ver. 580. Ruptis flammam exſpirare caminis; and Juvenal, ſat xiv. ver. 117.

Sed creſcunt quocunque modo, majoraque fiunt
Incude aſſidua, ſemperque ardente camino.

† Lib. vii. cap. 3: Coronarum aliæ ſunt puræ, aliæ cœlatæ. Conclavibus, ubi ignis, et plurima lumina ſunt ponenda, puræ fieri debent, ut eæ facilius extergantur. In æſtivis et exedris, ubi nullus

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nullus ignis uſus, ubi minime fumus eſt, nec fuligo poteſt nocere, ibi cœlatæ ſunt faciendæ. Semper enim album opus (*ſtucco-work*) propter ſuperbiam candoris, non modo ex propriis, ſed etiam ex alienis ædificiis concipit fumum. *Cap.* 4: Tricliniis hibernis non eſt utilis illa compoſitio, nec megalographia, nec camerarum coronario opere ſimilis ornatus, quod ea et ab ignis fumo, et ab luminum crebris fuliginibus corrumpantur. *One may ſee from this paſſage how imperfectly the ancients were acquainted with the art of lighting their apartments.*

[*] The name *atrium* had its riſe from the walls of ſuch places being black with ſmoke. *Iſidorus*, xv. 3. ſays, Atrium alii quaſi ab igne atrum dixerunt. Atrum enim fit ex fumo. This derivation

and on that account were juſtly named *fumoſæ*[*]. The ſmoke therefore muſt have been blown very much about, and carried into every apartment. In the houſes of the opulent, care in all probability was employed to keep them clean; but the habitations of families who did not belong to the common or pooreſt claſſes, are repreſented as ſmoky and black; and we are told that their walls and ceilings were full of ſoot. They were, therefore, called black houſes, as in Ruſſia the huts of the common people, which are furniſhed with paltry ſtoves, and which are blackened in the ſame manner by the ſmoke of the fir-wood uſed in them for fuel, are called black huts[†].

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derivation is given alſo by Servius, Æn. lib. i. ver. 730. Ibi et culina erat; unde et atrium dictum eſt; atrum enim erat ex fumo.

[*] *Seneca*, ep. 44. Non facit nobilem atrium plenum fumoſis imaginibus. *Cicero in Piſon.* cap. i. Obrepſiſti ad honores errore hominum, commendatione fumoſarum imaginum.

> Quis fructus generis tabula jactare capaci
> Corvinum, poſthac multis contingere virga
> Fumoſos equitum cum dictatore magiſtros,
> Si coram Lepidis male vivitur?
>
> JUVENAL. ſat. viii. ver. 6.

[†] In the *Equites* of Ariſtophanes the houſes of the common people are called γυπαι and γυπαρια, becauſe γυψ ſignifies *fuliginoſum* or *fuſcum*. See *Jac. Haſæi Diſſertatio de doliari habitatione Diogenis, in Heumanni Pæcile*, tom. i. p. 595. On account of the ſmoke they were called alſo μελαθρα. *Lycophron, Caſſand.* 770 and 1190. Μελαθρον αιθαλοεν, domicilium fuliginoſum, occurs

As the houſes of the ancients were ſo ſmoky, it may be eaſily comprehended how, by means of ſmoke, they could dry and harden, not only

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in Homer, Iliad. ii. ver. 414, of which expreſſion and i. ver. 204, the ſcholiaſt very properly gives the following explanation: απο του μελαινεσθαι υπο του καπνου, quoniam a fumo reddebantur nigræ. For the ſame reaſon, according to the ſcholiaſts, *Apollonius Rhodius*, lib. ii. ver. 1089, calls the middle beam of the roof μελαθρον. *Columella de re ruſt.* i. 17, ſays: *Fuligo quæ ſupra focos tectis inhæret*: among us the ſoot adheres to the funnel of the chimney, and not to the roof or ceiling.

> Tecta ſenis ſubeunt, nigro deformia fumo;
> Ignis in heſterno ſtipite parvus erat.
> Ovid. Faſt. lib. v. 505.

> Nigra fornicis oblitus favilla.
> Priap. carmen xiii. 10. p. 8.

In cujus hoſpitio nec fumi nec nidoris nebulam vererer. *Apuleii Metam.* 1. Volui relinquere avitos lares et conſcios natalium parietes, et ipſam nutriculam caſam, et fumoſa tecta, et conſitas meis manibus arbuſculas transferre deſtinatus exul decreveram. *Quintil. Declamat.* xiii. p. 275.

> Sordidum flammæ trepidant rotantes
> Vertice fumum.
> Horat. lib. iv. od. 11, 10.

It may be here ſaid, that the above paſſages allude to the hovels of the poor, which are black enough among us. Theſe are not, however, all ſo ſmoky and ſo covered with ſoot both without and within; for though this may be the caſe in ſome villages, the houſes of the common people in our cities may be called dirty rather than ſmoky. Theſe paſſages of Roman authors ſpeak principally of town-houſes. The houſe in which Horace wiſhed to entertain his Phyllis was not a mean one, for he tells her a little before, *Ridet argento domus.*

various articles uſed as food, but alſo different pieces of timber employed for making all ſorts of large and ſmall implements. In this manner was prepared the wood deſtined for ploughs, waggons, and ſhips, and particularly that of which rudders were formed *. For this reaſon pantries for fleſh and wine, and alſo coops to hold fowls, which were ſaid to thrive by ſmoke, were conſtructed near the kitchen, where it always abounded †; and on the other hand it was neceſſary to remove to a diſtance from kitchens, apartments deſtined for the purpoſe of preſerving ſuch articles as were liable to be ſpoiled by ſmoke ‡: but among us the caſe is widely

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* Πηδαλιον δ᾽ ευεργες ὑπερ καπνου κρεμασᾶσθαι.
Clavum fabrefactum ſuper fumum ſuſpendito.
Heſiodi Opera et Dies, ver. 627.

Virgil ſays the ſame thing:
Et ſuſpenſa focis exploret robora fumus.
Georg. lib. i. 175.

† Apothecæ recte ſuperponentur his locis, unde plerumque fumus exoritur, quoniam vina celerius vetuſteſcunt quæ fumi quodam tenore præcocem maturitatem trahunt. *Columella*, i. 6, 20. p. 406. Gallinaria juncta ſint ea furno, vel culinæ, ut ad avem perveniat fumus, qui eſt huic generi præcipue ſalutaris - - - - Huic autem focus applicetur tam longus, ut nec impediat prædictos aditus, et ab eo fumus perveniat in utramque cellam. Lib. viii. cap. 3. p. 636.

‡ Eadem ratio eſt in plano ſitæ vinariæ cellæ, quæ ſubmota procul eſſe debet a balneis, furno, ſterquilinio, reliquiſque immunditiis tetrum odorem ſpirantibus. *Columella*, lib. i. cap. 6, 11. p. 405. Artificial heat could not be employed to prevent oil from

widely different, for we often have neat and elegant apartments in the neighbourhood of the kitchen.

From what has been ſaid it will readily appear why the ancients kept by them ſuch quantities of hard wood, which, when burning, does not occaſion ſmoke. The ſame kind is even ſought after at preſent, and on this account we value that of the white and common willow, *ſalix alba* and *triandra;* becauſe, when burned in our chimneys, they make little ſmoke, and throw out feweſt ſparks. The great trouble, however, which was taken in old times to procure wood that would not ſmoke, clearly proves that this was much more neceſſary in thoſe periods than at preſent. It was cuſtomary to peel off the bark from the wood, to let it lie afterwards a long time in water, and then to ſuffer it to dry *. This proceſs muſt undoubtedly have

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from becoming clotted by being froze; for it was liable to be hurt by ſoot and ſmoke, the conſtant attendants of artificial warming. Oleum quod minus provenit, ſi congelatur, fraceſſet. Sed ut calore naturali eſt opus, qui contingit poſitione cœli et declinatione, ita non opus eſt ignibus ac flammis, quoniam fumo et fuligine ſapor olei corrumpetur. *Columella*, lib. i. cap. 6, 18.

* This method of preparing wood is thus deſcribed by Theophraſtus: Fumus acerbiſſimus fici, caprifici, et cujuſque lacteo ſucco humentis. Cauſſa humor eſt. Hæc tamen decorticata, et aqua ſuper infuſa madefacta, deinde ſiccata, omnium maxime immunia fumo evadunt, flammamque molliſſimam faciunt; utpote cum proprius quoque, innatuſque humor exemptus ſit. *Theophraſti Hiſt. Plant.* lib. v. cap. 10.

proved of great ſervice, for we know that wood which has been conveyed by water, in floats, kindles more readily, burns briſker, and throws out leſs ſmoke than that which has been tranſported from the foreſt in waggons. Another method, much employed, of rendering wood leſs apt to ſmoke, was to ſoak it in oil or oil-lees, or to pour oil over it *. With the like view wood, before it was uſed, was hardened or ſcorched over the fire, until it loſt the greater part of its moiſture, without being entirely reduced to charcoal. This method is ſtill employed with advantage in glaſs-houſes and porcelain manufactories, where there are ſtoves made on purpoſe to dry wood. Such ſcorched wood appears to be that to which the ancients gave the name of *ligna cocta* or *coctilia* †.

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* Codicillos oleaginos et cætera ligna amurca cruda perſpergito, et in ſole ponito, perbibant bene. Ita neque fumoſa erunt, et ardebunt bene. *Cato de re ruſt*. cap. 130. Poſtremo ligna macerata amurca nullius fumi tædio ardere. *Plin*. lib. xv. cap. 8.

† Such wood in Greek was called *ακαπνα*, in Latin *acapna*, in Homer's Odyſſey, book vi. καγκανα and δανα, Pollux. p. 621, καυσιμα. This wood is mentioned alſo by Galen, in *Antidot*. lib. i. *Digeſta*, lib. xxxii. de leg. 55, 7: Sed et titiones, et alia ligna cocta ne fumum faciant, utrum ligno an carboni, an ſuo generi adnumerabimus? Et magis eſt, ut proprium genus habeatur. *Digeſt*. lib. l. tit. 16, 167, *de verb. ſignificat*. where Ulpian repeats the ſame words. Trebellius Pollio in *Vita Claudii*, where an account is given of the firing allowed to him when a tribune by the emperor: Ligni quotidiani pondo mille, ſi eſt copia; ſin minus, quantum

It was ſold in particular warehouſes at Rome, called *tabernæ coctiliariæ*, and the preparing as well as the ſelling of it formed an employment followed by the common people, and which, as we are told, was carried on by the father of the emperor Pertinax[*]. When it was neceſſary to kindle fire without wood prepared in that manner, an article probably too expenſive for indigent families, we find complaints of ſmoke which brought on a watering of the eyes; and this was the caſe with Horace at

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quantum fuerit et ubi fuerit; coctilium quotidiana batilla quatuor. It appears from this paſſage that wood was given out or ſold by weight, as it is at preſent at Amſterdam. On the other hand, the *coctilia* were meaſured like coals. *Martial. Epigram.* lib. xiii. ep. 15: Ligna acapna.

Si vicina tibi Nomento rura coluntur,
Ad villam moneo, ruſtice, ligna feres.

It would ſeem that in the above-mentioned neighbourhood there was no wood proper for firing, ſo that people were obliged to purchaſe that which had been dried. Some hence conclude that the *acapna* muſt not have been dear, becauſe it is recommended to a countryman. But the advice here given is addreſſed to the poſſeſſor of a farm who certainly could afford to purchaſe dried wood.

[*] Nam pater ejus tabernam coctiliciam (coctiliariam) in Liguria exercuerat. Sed poſtquam in Liguriam venit, multis agris coemptis, tabernam paternam, manente forma priore, infinitis ædificiis circumdedit; fuitque illic per triennium, et mercatus eſt per ſuos ſervos. *Jul. Capitol. in Vita Pertin.* cap. iii. Capitolinus ſays before, that the father carried on *lignariam negotiationem*. See the annotations of Saumaiſe and Caſaubon.

a paltry inn where he happened to ſtop when on a journey [*].

However imperfect may be the information which can be collected from the Greek and Roman authors reſpecting the manner in which the ancients warmed their apartments, it nevertheleſs ſhews that they commonly uſed for that purpoſe a large fire-pan or portable ſtove, in which they kindled wood, and, when the wood was well lighted, carried it into the room, or which they filled with burning coals. When Alexander the Great was entertained by a friend in winter, as the weather was cold and raw, a ſmall fire-baſon was brought into the apartment to warm it. The prince, obſerving the ſize of the veſſel, and that it contained only a few coals, deſired his hoſt, in a jeering manner, to bring more wood or frankincenſe, giving him thus to underſtand that the fire was fitter for burning perfumes than to produce heat [†]. Anacharſis, the Scythian philoſopher, though diſpleaſed with many of the Grecian cuſtoms, praiſed the Greeks, however, becauſe they ſhut out the ſmoke and brought only fire into their houſes [*]. We are informed by Lampridius, that the extravagant Heliogabalus cauſed to be burned in theſe ſtoves, inſtead of wood, Indian ſpiceries and coſtly perfumes [†]. It is alſo worthy of notice, that coals were found in ſome of the apartments of Herculaneum, as we are told by Winkelmann, but neither ſtoves nor chimneys. As in Perſia and other countries of the Eaſt no ſtoves made in the European manner are uſed at preſent; and as it is certain that the manners, cuſtoms, and furniture of the early ages have been retained there almoſt without variation, we have reaſon to ſuppoſe that the methods employed by the inhabitants for warming themſelves are the ſame as thoſe uſed by the ancients. They agree perfectly with the deſcriptions given by the Greek and Roman authors, and ſerve in ſome meaſure to illuſtrate them. I ſhall therefore here inſert the account given by De la Valle, as it is the cleareſt and moſt to the purpoſe [‡].

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[*] — — — — niſi nos vicina Trivici
Villa recepiſſet, lacrimoſo non ſine fumo;
Udos cum foliis ramos urente camino.
Horat. lib. i. ſat. 5, 80.

Plutarch. Sympoſ. lib. ii. cap. 1. Laco gymnaſii præfecto, qui ligna non fumantia, ακαπνα ξυλα, præbuerat, id ſe vitio dare ſimulans, Horum cauſſa, inquit, apud vos non licuit lacrimare.

[†] Hyeme in magno gelu exceptus convivio ab amico quodam, cum is focum ignemque exiguum (εσχαραν δε μικραν και πυρ ολιγον) intuliſſet, aut ligna eum, aut thus adferre juſſit. *Plutarch. Apothegm.* p. 180.

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[*] Anacharſis ille ſapiens, alia Græcorum inſtituta reprehendens, prunas laudavit, quod, fumo excluſo, domi ignem portarent. *Plutarch. Sympoſ.* lib. vi. 7. p. 692.

[†] Odores Indicos ſine carbonibus ad vaporandas zetas jubebat incendi. *Æl. Lamprid. Vita Heliogab.* cap. 31.

[‡] Reiſen des Della Valle. Genf, 1674, fol. vol. ii. p. 8.

"The Perſians," ſays he, "make fires in their "apartments, not in chimneys as we do, but in "ſtoves in the earth, which they call *tennor*. Theſe "ſtoves conſiſt of a ſquare or round hole, two "ſpans or a little more in depth, and in ſhape not "unlike an Italian caſk. That this hole may "throw out heat ſooner, and with more ſtrength, "there is placed in it an iron veſſel of the ſame "ſize, which is either filled with burning coals, "or a fire of wood and other inflammable ſub"ſtances is made in it. When this is done, they "place over the hole or ſtove a wooden top, like a "ſmall low table, and ſpread above it a large co"verlet quilted with cotton, which hangs down "on all ſides to the floor. This covering condenſes "the heat, and cauſes it to warm the whole apart"ment. The people who eat or converſe there, "and ſome who ſleep in it, lie down on the floor "above the carpet, and lean, with their ſhoul"ders againſt the wall, on ſquare cuſhions, upon "which they ſometimes alſo ſit; for the *tennor* "is conſtructed in a place equally diſtant from "the walls on both ſides. Thoſe who are not "very cold only put their feet under the table or "covering; but thoſe who require more heat can "put their hands under it, or creep under it alto"gether. By theſe means the ſtove diffuſes over "the whole body, without cauſing uneaſineſs to the "head, ſo penetrating and agreeable a warmth, "that I never in winter experienced any thing

“ more pleaſant. Thoſe, however, who require “ leſs heat let the coverlet hang down on their “ ſide to the floor, and enjoy without any incon- “ venience from the ſtove the moderately heated “ air of the apartment. They have a method alſo “ of ſtirring up or blowing the fire when neceſſary, “ by means of a ſmall pipe united with the tennor “ or ſtove under the earth, and made to project “ above the floor as high as one chooſes, ſo that “ the wind when a perſon blows into it, becauſe it “ has no other vent, acts immediately upon the “ fire like a pair of bellows. When there is no “ longer occaſion to uſe this ſtove, both holes are “ cloſed up, that is to ſay, the mouth of the ſtove “ and that of the pipe which conveys the air to it, “ by a flat ſtone made for that purpoſe. Scarcely “ any appearance of them is then to be perceived, “ nor do they occaſion inconvenience, eſpecially “ in a country where it is always cuſtomary to co- “ ver the floor with a carpet, and where the walls “ are plaſtered. In many parts theſe ovens are “ uſed to cook victuals, by placing kettles over “ them. They are employed alſo to bake bread, “ and for this purpoſe they are covered with a large “ broad metal plate, on which the cake is laid; but “ if the bread is thick and requires more heat, it “ is put into the ſtove itſelf [*].”—I ſhall here remark,

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[*] See *Taverniers Reiſen*, Genf, 1681, fol. vol. i. p. 276; *Olearius Reiſebeſchreibung*, Hamburg 1696, fol. vol. i. p. 291; *Schweiggers*

mark, that the Jews uſed ſuch ſtoves in their houſes, and the prieſts had them alſo in the temple *.

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gers Reiſebeſchreibung nach Conſtantinopel und Jeruſalem, p. 264; *Voyage de Chardin*, Rouen 1723, 12mo. vol. iv. p. 236; *Voyage litteraire de la Grèce, par M. Guys*, Paris 1776, 2 vol. 8vo. i. p. 34. Becauſe this author is one of the lateſt who has taken the trouble to compare the manners of the ancient and modern Greeks, I ſhall here give his account at full length. The Greeks have no chimneys in the apartments of their houſes; they make uſe only of a chaffing-diſh, which is placed in the middle of the apartment to warm it, or for the benefit of thoſe who chooſe to approach it. This cuſtom is very ancient throughout all the Eaſt. The Romans had no other method of warming their chambers; and it has been preſerved by the Turks. Λαμπτηρ, ſays Heſychius, was a chaffing-diſh placed in the middle of a room, on which dry wood was burned to warm it, and reſinous wood to give light. This chaffing-diſh was ſupported, as thoſe at preſent, by a tripod: lamps were not introduced till long after. To ſecure the face from any inconvenience, and from the heat of the chaffing-diſh, oftentimes dangerous, the *tendour* was invented. This is a ſquare table upon which the fire is placed. It is covered with a carpet which hangs down to the floor, and with another of ſilk, more or leſs rich, by way of ornament. People ſit around it either on a ſofa or on the pavement, and they can at the ſame time put their hands and their feet under the covering, which, as it encloſes the chaffing-diſh on all ſides, preſerves a gentle and laſting heat. The tendour is deſtined principally for the uſe of the women, who during the winter paſs the whole day around it, employed either in embroidering or in receiving the viſits of their friends.

* As a proof of this, Faber in his *Archæologie der Hebräer*, Halle 1773, 8vo. p. 432, quotes *Kelim*, v. 1, and Maimonides and Bartenora, p. 36, *Tamid*, c. 50. Compare *Othon. Lex Rabbin.* p. 85.

Thoſe who have employed their talents on this ſubject before me, have collected a great many paſſages from the Greek and Roman writers which ſpeak of fires made for the purpoſe of affording warmth: but as they contain nothing certain or deciſive, I ſhall not here enlarge upon them *.

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* As it would be tedious to tranſcribe all theſe paſſages, I ſhall, as examples, give only the following:

Diſſolve frigus, ligna ſuper foco
Large reponens.
Horat. lib. i. od. 9, 5.

Theſe lines ſhew that the poet had an averſion to cold when enjoying his bottle, and that he wiſhed for a good fire; but they do not inform us whether the hearth, *focus*, had a chimney. We learn as little from the advice of *Cato*, c. 143, p. 104: Focum purum circumverſum quotidie, priuſquam cubitum eat, habeat. It was certainly wholeſome to rake the fire together at night, but it might have burned either with or without a chimney. *Columella*, lib. xi. 1. p. 744, Conſueſcat ruſticos circa larem domini, focumque familiarem. *Cicero*, *Epiſt. famil.* lib. vii. 10: Valde metuo ne frigeas in hibernis; quam ob rem camino luculento utendum cenſeo. Cicero perhaps underſtood under that term ſome well-known kind of ſtove which afforded a ſtrong heat. *Suetonius*, *in Vita Vitellii*, cap. viii: Nec ante in Prætorium rediit, quam flagrante triclinio ex conceptu camini. As Vitellius was proclaimed emperor in January, a warm dining-room was certainly neceſſary. *Sueton. in Vita Tiber. Ner.* cap. 74: Miſeni cinis e favilla et carbonibus ad calefaciendum triclinium illatus, extinctus et jam diu frigidus exarſit repente prima veſpera, atque in multam noctem pertinaciter luxit. This paſſage however ſeems to allude to a chaffing-diſh filled with charcoal. *Tertullian. de pænitentia*, lib. v. cap. 12: Quid illum fumariolum ignis æterni æſtimabimus, Though one or more expreſſions may appear to allude to a chimney, and even if we ſhould conclude from them, with Montfaucon, that the ancients were acquainted with the art of conſtructing in

timabimus, cum fumariola quædam ejus tales flammarum ictus ſuſcitent, ut proximæ urbes aut jam nullæ exſtent, aut idem ſibi de die ſperent ? Tertullian appears to allude here to Mount Veſuvius, and to compare it to a ſmall tennor. I ſhall on this occaſion remark, that Du Cange in his *Gloſſarium* quotes the word *fumariolum* from the *Paræneticum ad pœnitentiam* of the Spaniard Pacianus ; but the latter takes the whole paſſage from Tertullian, who wrote more than a century before. *Sidonius Apollin.* lib. ii. epiſt. i. p. 102 : A cripto porticu in hyemale triclinium venitur, quod arcuatili camino ſæpe ignis animatus pulla fuligine infecit. No one can determine with certainty the meaning of *arcuatilis caminus.* A covering made of a thin plate of metal, or a ſcreen, was perhaps placed over a portable ſtove ; we however learn, that even where the *arcuatilis caminus* was uſed, the beauty of the dining-room was deſtroyed by ſmoke and ſoot. *Ammianus Marcell.* lib. xxv. in the end of the life of Jovian : Fertur recente calce cubiculi illiti ferre odorem noxium nequiviſſe, vel extuberato capite periiſſe ſuccenſione prunarum immenſa. This in an apartment where there was a ſtove or a chimney would have been impoſſible.

The following paſſage of *Athenæus*, lib. xii. p. 519, will admit of various explanations : Apud Sybaritas reperta ſunt cava et anguſta cœnacula (πυελοι), in quibus tantiſper dum menſis accumberent calore foverentur. Dalechamp thinks that πυελοι were the *poeles* of the French : Locus in ædibus hypocauſto tepens, in quo per hyemem prandetur ac cœnatur, quod adverſus frigora præſidium in Germania ubique adhibetur. They muſt conſequently have been like our ſtoves. Caſaubon, however, in his *Animad. in Athen.* lib. xii. cap. 3. p. 833, ſays they were bathing-tubs: *Solia* in maſon-work elevated funnels for conveying off the ſmoke, it muſt be allowed, when we conſider the many proofs which we find to the contrary, that they were, at any rate, extremely rare. As they are ſo convenient and uſeful, and can be eaſily conſtructed upon moſt occaſions, it is impoſſible, had they been well known, that they ſhould have ever been forgotten. Montfaucon ſays, from *caminus* is derived *chiminea* of the Spaniards; *camino* of the Italians; *cheminée* of the French; and *kamin* of the Germans; and it ſeems, adds he, beyond a

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Solia aut cellæ ſudatoriæ. This opinion, which is in ſome meaſure confirmed by Suidas, who gives that meaning to πυελος; and by Jul. Pollux, in whom it occurs in the ſame ſenſe more than once, is adopted by Ferrarius. Sybaritæ, *ſays he*, pro lectis tricliniaribus, in quibus ad menſam diſcumberent, alveos excogitarunt, aqua calida plenos, in quibus tanquam in lectis menſæ accumbebant, iiſque corpora mergebant, ut calidæ tepore inter comedendum foverentur. Lipſius on the other hand rejects all theſe explanations, and conſiders the πυελοι to have been *thecæ, lectulorum inſtar, quibus ſupponerentur in teſtis carbones, ad modice calefaciendum qui incubaret*. Lipſius therefore means veſſels ſimilar to thoſe which in low German are called *riken*, and which, inſtead of our ſtoves, are much uſed in Holland by the women, who ſeldom approach the chimney. The ancients were certainly acquainted with ſuch *riken*, but they were not called πυελοι. Suidas ſays, Αιθρανος, το γυναικειον υποποδιον, εν ῳ ως δι' οπης αυτων θερμαινονται τοις καρβοισιν. Aithranus, dictum muliebre ſcabellum pedibus ſuppoſitum, in quo per foramen calefiebant carbonibus. I ſhall refer thoſe who are diſpoſed to criticiſe this explanation to the before-quoted paſſage of Ariſtophanes, *Veſp.* 141, where they will find του πυελου το τρημα, folii foramen, which was ſo wide that a man could creep through it.

doubt, that the name, with the thing ſignified, has been tranſmitted to us from the ancients. Though this derivation be juſt, the concluſion drawn from it is falſe. The ancient name of a thing is often given to a new invention that performs the ſame ſervice. The words mill and *moulin* came from *mola*; and yet our mills were unknown to the ancients. Guys relates, that a Greek woman, ſeeing an European lady covered with a warm cloak, ſaid, " That woman carries her *tennor* about with " her."

Beſides the methods already mentioned, of warming apartments, the ancients had another ſtill more ingenious, which was invented and introduced about the time of Seneca *. A large ſtove or ſeveral ſmaller ones were conſtructed in the earth under the edifice; and theſe being filled with burning coals, the heat was conveyed from them into dining-rooms, bed-chambers, or other apartments which one wiſhed to warm † by means of pipes incloſed in the walls. The upper end of theſe ſteam-pipes was often ornamented with the repreſentation of a lion's or a dolphin's head, or any other figure according to fancy, and could be opened or ſhut at pleaſure. It appears that this apparatus was firſt conſtructed in the baths, and became extended afterwards to common uſe. Theſe pipes ſometimes were conducted around the whole edifice[*], as I have ſeen in our theatres. Palladius adviſes a branch of ſuch pipes to be conveyed under the floor of an oil-cellar, in order that it may be heated without contracting ſoot[†]. Such a mode of warming apartments, which approaches very near to that employed in our German ſtoves, would have been impoſſible, had the houſes been without windows; and it is worthy of remark, that tranſparent windows, at the time Seneca lived, were entirely new. Theſe

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* Quædam noſtra demum prodiſſe memoria ſcimus, ut ſpeculariorum uſum, perlucente teſta, clarum tranſmittentium lumen; ut ſuſpenſuras balneorum, et impreſſos parietibus tubos per quos circumfunderetur calor, qui ima ſimul et ſumma foveret equaliter. *Seneca*, ep. 90.

† Quem ſpecularia ſemper ab adflatu vindicarunt, cujus pedes inter fomenta ſubinde mutata tepuerunt, cujus cœnationes ſubditus et parietibus circumfuſus calor temperavit, hunc levis aura non ſine periculo ſtringet. *Senec. de provident.* p. 138. In balneariis

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ariis aſſa in alterum apodyterii angulum promovi, proterea quod ita erant poſita, et eorum vaporarium, ex quo ignis erumpit, eſſet ſubjectum cubiculo. *Cicero ad fratrem*, lib. iii. ep. 1. Adhæret dormitorium membrum tranſitu interjacente, qui ſuſpenſus et tabulatus conceptum vaporem ſalubri temperamento huc illuc digerit et miniſtrat. *Plin.* lib. ii. ep. 17.

[*] Quid nunc ſtrata ſolo referam tabulata, crepantes
Auditura pilas, ubi languidus ignis inerrat
Ædibus, et tenuem volvunt hypocauſta vaporem?
Statii Sylv. lib. i. 5, 17.

[†] At ſi quis majori diligentiæ ſtudet, ſubjectis hinc inde cuniculis pavimenta ſuſpendat, et ignem ſuggerat fornace ſuccenſa. *Pallad. de re ruſt.* lib. i. 20. p. 876.

pipes, like thoſe of our ſtoves, could not fail in the courſe of time to become filled with ſoot; and as they were likely to catch fire by being overheated, laws were made forbidding them to be brought too near to the wall of a neighbouring houſe *, though there were other reaſons alſo for this regulation. As what is here ſaid will be better elucidated by a deſcription of the ſtill exiſting ruins of ſome ancient baths, I ſhall tranſcribe the following paſſage from Winkelmann:

“ Of chimneys in apartments,” ſays this author, “ no traces are to be ſeen. Coals were found in “ ſome of the rooms in the city of Herculaneum, “ from which we may conclude that the inhabitants “ uſed only charcoal fires for warming themſelves. “ In the houſes of the common citizens at Naples, “ there are no chimneys at preſent; and people of “ rank there as well as at Rome, who ſtrictly adhere to the rules laid down by phyſicians for preſerving health, live in apartments without chimneys, and which are never heated by coal-fires. “ In the villas, however, which were ſituated without Rome, on eminences where the air was “ purer and colder, the ancients had *hypocauſta* or

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[*] Quidam Hiberus nomine, qui habet poſt horrea mea inſulam, balnearia fecit ſecundum parietem communem; non licet autem tubulos habere admotos ad parietem communem. De tubulis eo amplius hoc juris eſt, quod per eos flamma torretur paries. *Digeſtor.* lib. viii. tit. 2, 13.

" ſtoves, which were more common perhaps than
" in the city. Stoves were found in the apart-
" ments of a ruined villa, when the ground was
" dug up to form a foundation for the buildings
" erected there at preſent. Below theſe apart-
" ments there were ſubterraneous chambers, about
" the height of a table, two and two under each
" apartment, and cloſe on all ſides. The flat top
" of theſe chambers conſiſted of very large tiles,
" and was ſupported by two pillars, which, as well
" as the tiles, were joined together, not with lime
" but ſome kind of cement, that they might not
" be ſeparated by the heat. In the roofs of theſe
" chambers there were ſquare pipes made of clay,
" which hung half-way down into each, and the
" mouths of them were conveyed into the apart-
" ment above. Pipes of the like kind, built into
" the wall of this lower apartment, roſe into an-
" other in the ſecond ſtory, where their mouths
" were ornamented with the figure of a lion's head,
" formed of burned clay. A narrow paſſage, of
" about two feet in breadth, conducted to the
" ſubterranean chambers, into which coals were
" thrown through a ſquare hole, and the heat
" was conveyed from them by means of the be-
" fore-mentioned pipes into the apartment im-
" mediately above, the floor of which was com-
" poſed of coarſe moſaic-work, and the walls were
" incruſted with marble. This was the ſweat-
" ing apartment (*ſudatorium*). The heat of this

" apartment was conveyed into that on the ſecond " ſtory by the clay pipes encloſed in the wall, " which had mouths opening into the former, as " well as the latter, to collect and afford a paſſage " to the heat, which was moderated in the upper " apartment, and could be increaſed or leſſened " at pleaſure." Such a complex apparatus would have been unneceſſary had the Romans been acquainted with our ſtoves *.

I have, as yet, made no mention of a paſſage of the emperor Julian, which is too remarkable to be entirely omitted; though, at the ſame time, it is ſo

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* The following paſſage from *And. Baccii Libr. de thermis*, Patav. 1711, fol. p. 263, contains information much of the ſame kind. Veſtigium antiquum tubulorum ejuſmodi parietibus impreſſorum viſitur in ſacrario S. Helenæ, in eccleſia S. Crucis in Hieruſalem, qui ſub opere tectorio quadrata forma, quatuor digitorum latitudine, ac triplici conjuncti ordine, ab imo (ut mihi videtur) hypocauſto, calores in ſupernas ædium partes deferre debebant. See alſo *Franc. Robortelli Laconici ſeu ſudationis quæ adhuc viſitur in ruina balnearum Piſanæ urbis explicatio*, in *Theſaurus antiq. Roman.* vol. xii. p. 385. *Vitruvii de architectura libri, cum annotat. Gulielmi Philandri Caſtilionii.* Lugduni 1586, 4to. p. 279. Philander ſays that the ancients conveyed from ſubterranean ſtoves, into the apartments above, the ſteam of boiling water; but of this I have found no proof. If this be true, the Roman baths muſt have been like the Ruſſian ſweating-baths, a deſcription of which may be found in Mr. Schlozer's Treatiſe on the harmleſſneſs of the ſmall-pox in Ruſſia. Gottingen 1768. 8vo.

corrupted

corrupted that little can be collected from it *. Julian relates, that during his reſidence at Paris the winter was uncommonly ſevere; but that he would not allow the houſe in which he lived to be heated, though it had the ſame apparatus for that purpoſe as the other houſes of the city. His reaſon for this was, that he wiſhed to inure himſelf to the climate; and he was apprehenſive alſo, that the walls by being heated might become moiſt and throw out a damp vapour. He ſuffered, there-

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* Erat tum hyems ſolito vehementior, et fluvius quaſi marmoreas cruſtas prætervehebat, (noſtis lapidem Phrygium, cui perſimiles erant iſtius candidi lapidis cruſtæ concretæ, magnæ et aliæ ex aliis labentes) quin etiam fluvium conjuncturæ et tanquam pontem facturæ videbantur. Cum igitur in his rebus durior et agreſtior eſſem quam unquam antea, nequaquam cubiculum in quo requieſcebam calefieri patiebar, quo modo illic pleraque domicilia ſub caminis calefiunt, cum tamen ad ignis calorem excipiendum eſſet opportunum.—Ονπερ ειωθει τροπον ὑπο ταις καμινοις τα πολλά των οικηματων εκει θερμαινεσθαι. Και ταυτα εχων ευπρεπως προς το παραδεξασθαι την εκ του πυρος αλεαν. Quod tum quoque accidit ob meam duritiem, atque in me ipſum præcipue, ut vere dicam, inhumanitatem, qui me ad illum aerem tolerandum aſſueſacere volebam, ejus præſidii maxime indigentem. Cumque hyems invaleſceret, atque in dies fieret vehementior, ne tum quidem famulis meis permiſi, ut domicilium, το οικημα, calefacerent; veritus ne humorem, qui in parietibus erat, commoverem; itaque accenſum ignem et candentes aliquot carbones, πυρ κεκαυμενον και ανθρακας λαμπρους, inferri juſſi. Hi vero, etſi non multi erant, tamen multum vaporem e parietibus excitarunt, a quo cum caput meum oppletum eſſet, ſomnus me complexus eſt. Ac ſane metui ne ſuffocarer. *Juliani Miſopogon*, in *Juliani operibus*, Lipſiæ 1696, fol. p. 341.

fore,

ſore, burning coals only to be brought into his apartment, which, however, occaſioned pains in his head, and other diſagreeable ſymptoms. What apparatus the houſes of Paris then had for producing heat, no one can conjecture from the paſſage alluded to. In my opinion, they were furniſhed with the above-deſcribed ſubterranean ſtoves: but even if theſe ſhould not be here meant, I cannot help thinking that the emperor's relation confirms that they had not chimneys like ours; for, had the caſe been otherwiſe, the cautious prince would not have expoſed himſelf to the vapour of coals, the noxious quality and effects of which could not be unknown to him.

Though the great antiquity of chimneys is not diſputed, too little information has been collected to enable us to determine, with any degree of certainty, the period when they firſt came into uſe. If it be true, as Du Cange, Voſſius and others affirm, that apartments called *caminatæ* were apartments with chimneys, theſe muſt, indeed, be very old; for that word occurs ſo early as the year 1069, and perhaps earlier *; but it is always found connected in ſuch a manner as contradicts entirely the above ſignification †. Papias the grammarian, who wrote about 1051, explains the word *fumarium* by *caminus per quem exit fumus*; and Johannes de Janua, a monk, who about 1268 wrote his *Catholicon*, printed at Venice, ſays *Epicauſtorium, inſtrumentum quod fit ſuper ignem cauſſa emittendi fumum.* But theſe *fumaria* and *epicauſtoria* may have been pipes by which the ſmoke, as is the caſe in our vent-furnaces, was conveyed through the neareſt wall or window: at any rate this expreſſion, with its explanations, can afford no certain proof that chimneys are ſo old *; eſpecially as later writers give us reaſon to believe the contrary. Riccobaldus de Ferrara †, Galvano Fiamma or Flamma, a Dominican monk from Milan ‡, who died in 1344 profeſſor at Pavia, and Giovanni de Muſſis, who about 1388 wrote his *Chronicon Placentinum* ‖, and all the writers of the fourteenth century, ſeem either to have been unacquainted with chimneys, or to have conſidered them as the neweſt invention of luxury.

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* Zanetti, page 78, quotes a charter of that year, in which the following words occur: Cum tota ſua cella et domo, et caminatis cum ſuo ſolario, et aliis caminatis.

† Muratori, Antiquit. Ital. med. æv. vol. ii. p. 418.

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* Such is the opinion of Muratori as above quoted. Sed ne hæc quidem ſatis ſunt ad perſuadendum, in hac re nobis tradenda deceptos fuiſſe ſcriptores ſupra laudatos *(who deny that the ancients had chimneys)*; nam et antiquis ſæculis in culinis aliiſque ædium cubiculis ignis accendebatur, ac fumi inde educendi ne tunc quidem ratio deſiderabatur, quamquam tempora illa caminis noſtris in tectum uſque productis caruiſſe ſtatueremus.

† In Muratori, Script. Ital. vol. ix.

‡ His Chronicle of the Milaneſe is printed in Muratori.

‖ In Muratori, vol. xvi. p. 582. Homines Placentiæ ad præſens vivunt ſplendide et ornate et nitide, et utuntur in domibus eorum pulcrioribus et melioribus arnixiis et vaſellamentis, quam ſolebant a ſeptuaginta annis retro, ſcilicet ab anno Chriſti 1320 retro: et habent pulcriores habitationes quam tunc habebant, quia in dictis eorum domibus ſunt pulcræ cameræ et caminatæ, bora, curtaricia,

That there were no chimneys in the tenth, twelfth and thirteenth centuries, ſeems to be proved by the ſo called *ignitegium*, or *pyritegium*, the curfeu-bell of the Engliſh, and *couvre-feu* of the French. In the middle ages, as they are termed, people made fires in their houſes in a hole or pit in the centre of the floor, under an opening formed in the roof; and when the fire was burnt out, or the family went to bed at night, the hole was ſhut by a cover of wood. In thoſe periods a law was almoſt every where eſtabliſhed, that the fire ſhould be extinguiſhed at a certain time in the evening; that the cover ſhould be put over the fire-place; and that all the family ſhould retire to reſt, or at leaſt be at home *. The time when this ought to be done was ſignified by the ringing of a bell. Wil-

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taricia, putei, hortuli, jardini et ſolaria pro majori parte; et ſunt plures camini ab igne et fumo in una domo, in quibus domibus dicto tempore nullum ſolebat eſſe caminum; quia tunc faciebant unum ignem tantum in medio domus ſub cupis tecti, et omnes de dicta domo ſtabant circum circa dictum ignem, et ibi fiebant coquina - - - - Modus edendi pro majori parte hominum Placentiæ eſt, quod ad primam tabulam comedit dominus domus cum uxore et filiis in caminata vel in camera ad unum ignem, et familia comedit poſt eos in alia parte ad alium ignem, vel in coquina pro majori parte.

* Reiſke ad Ceremon. aulæ Byzant. p. 145.

liam the conqueror introduced this law into England in the year 1068, and fixed the *ignitegium* at ſeven in the evening, in order to prevent nocturnal aſſemblies*; but this law was aboliſhed by Henry I in 1100. From this ancient practice has ariſen, in my opinion, a cuſtom in Lower Saxony of ſaying, when people wiſh to go home ſooner than the company chooſe, that they hear the *bürgerglocke*, burghers' bell. The ringing of the curfeu-bell gave riſe alſo to the prayer-bell, as it was called, which has ſtill been retained in ſome proteſtant countries, Pope John XXIII, with a view to avert certain apprehended misfortunes, which rendered his life uncomfortable, gave orders that every perſon, on hearing the *ignitegium*, ſhould repeat the *Ave Maria* three times †. When the appearance of a comet and a dreadof the Turks afterwards alarmed all

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* The following paſſages of old writers, collected by Du Cange, allude to this law. *Statuta Leichefeldenſis eccleſiæ in Anglia:* Eſt autem ignitegium qualibet nocte per annum pulſandum hora ſeptima poſt meridiem. *Statuta Maſſil.* lib. v. cap. 4: Statuimus hac præſenti conſtitutione perpetuo obſervandum, quod nullus de cætero vadat per civitatem Maſſiliæ vel ſuburbia civitatis contigua de nocte, ex quo campana, quæ dicitur Salvaterra, ſonata fuerit, ſine lumine. *Charta Johannis electi archiepiſc. Upſalienſis*, an. 1291: Statuimus, ut nullus extra domum poſt ignitegium ſeu coverfu exeat.

† Polydor. Vergil. de rerum inventor. lib. vi. cap. 12. edit. Lugduni Batav. 1664, 12mo. p. 460. Concilium Senonenſe anno 1347, cap. 13: Præcipimus, quod obſervetur inviolabiliter ordinatio facta per S. M. Joannem P. P XXIII. de dicendo ter Ave Maria, tempore ſeu hora ignitegii.

Chriſtendom, Pope Calixtus III increaſed theſe periodical times of prayer by ordering the prayer-bell to be rung alſo at noon *.

The oldeſt certain account of chimneys with which I am acquainted, occurs in the year 1347; for an inſcription which is ſtill exiſting or did exiſt at Venice, relates that at the above period a great many chimneys *(molti camini)* were thrown down by an earthquake †. This circumſtance is confirmed by John Villani, the hiſtorian, who died at Florence in 1348, and who calls the chimneys *fumajuoli* ‡. Galeazzo Gataro, who in the

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* Apparente per aliquot dies cometa critico et rubeo, cum mathematici; ingentem peſtem, caritatem annonæ, magnam aliquam cladem futuram dicerent - - - mandavit Calixtus, ut aſſiduo rogatu Deus flecteretur, in meridie campanis ſignum dari fidelibus omnibus, ut orationibus eos juvarent qui contra Turcas continuo dimicabant. Compare with the above *Hannoveriſche gelehrte anzeigen* 1754, zugabe, p. 195, where the anonymous editor makes no mention of the *ignitegium*. The year alſo 1357 is probably an error of the preſs, and ought to be read 1457; for Calixtus was not elected to the papal chair till 1455.

† Nella iſcrizione in marmo poſta ſopra la maggior porta della ſcuola grande di Santa Maria della Carità, in cui ſi deſcrive il tremuoto che affliſſe la noſtra città nell' accennato anno 1347, ſi nota che caddero molti camini. *Dell' origine di alcune arti principali appreſſo i Veneziani.* Venezia 1758, 4to. p. 80.

‡ Nel detto anno (1347) Venerdi notte di 25 di Gennaio, furono diverſi e grandiſſimi tremuoti in Italia, nella città di Piſa, e di Bologna, e di Padova, e maggiormente nella città di Vinegia, nella quale rovinarono infiniti fumajuoli, che ve ne havea aſſai

Dictionary of learned men is named De Gataris, and who died of the plague in 1405, ſays in his Hiſtory of Padua, which was afterwards improved and publiſhed by his ſon Andrew, that Franceſco da Carraro, lord of Padua, came to Rome in the year 1368, and finding no chimneys in the inn where he lodged, becauſe at that time fire was kindled in a hole in the middle of the floor, he cauſed two chimneys, like thoſe which had been long uſed at Padua, to be conſtructed, and arched by maſons and carpenters whom he had brought along with him. Over theſe chimneys, the firſt ever ſeen at Rome, he affixed his arms, which were ſtill remaining in the time of Gataro *.

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e belli; e piu campanili de chieſe, e altre caſe nella detta città s'aperſono, e tali rovinarono. *In the annotations ſtands:* Fumajuoli vogliano dire cammini. *Hiſtorie Fiorentine di Giovan. Villani,* lib. xii. cap, 121, in *Muratori, Script. rerum Italicar.* vol. xiii. p. 1001.

* This *Chronicon Patavinum* may be found in *Muratori, Scriptor. rerum Ital.* vol. xvii. The paſſage here alluded to, which occurs page 46, is as follows: Et eſſendo il Signore Meſſer Franceſco da Carraro giunto per albergare nell' albergo della Luna, et in quella ſtanza non trovando alcun camino per fare fuoco, perchè nella città di Roma allora non ſi uſavano camini, anzi tutti facevano fuoco in mezzo delle caſe in terra, e tali facevano ne i caſſoni piena di terra i loro fuochi; e non parendo al Signore Meſſer Franceſco di ſtare côn ſuo commodo in quel modo, aveva menati con lui muratori, e morangoni ed ogn' altra ſorta d'artefici; e ſubito fece fare due nappe de camini, e le arcuole in volto al coſtume di Padova con l'armi ſue ſiſſe ſopra eſſe nappe, che ancora ſi poſſono vedere; e dopo quelle da altri a i tempi indietro ne furono fatte aſſai; e laſciò queſta memoria di ſe nella città di Roma.

While chimneys continued to be built in ſo ſimple a manner, and of ſuch a width as they are ſtill obſerved to be in old houſes, they were ſo eaſily cleaned that this ſervice could be performed by a ſervant with a wiſp of ſtraw, or a little bruſhwood faſtened to a rope; but after the flues, in order to ſave room, were made narrower, or when ſeveral flues were united together, the cleaning of them became ſo difficult, that they required boys, or people of ſmall ſize, accuſtomed to that employment. The firſt chimney-ſweepers in Germany came from Savoy, Piedmont, and the neighbouring territories *. Theſe for a long time were the only countries where the cleaning of chimneys was followed as a trade; and I am thence inclined to conjecture rather that chimneys were invented in Italy †, than that the Savoyards learned the art of climbing from the marmots or mountain rats, as ſome have aſſerted ‡. Theſe needy but induſtrious people choſe and appropriated to themſelves,

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* I ſpazzacamini vengono communemente dalle vallate, come dal Lago di Como, dal Lago maggiore, da Valcamonica, da val Brombana, e anco dal Piemonte. *Gazoni Piazze univerſale.* In Venetia 1610. 4to. p. 364.

† A writer in the German Encyclopedie conjectures that the Italian architects employed in Germany to build houſes and palaces of ſtone, brought with them people acquainted with the art of conſtructing larger and more commodious chimneys than thoſe commonly uſed.

‡ Dictionnaire des arts et des metiers, par Jaubert, vol. iv. p. 534.

ſelves, perhaps, this occupation, becauſe they could find no other ſo profitable. The Lotharingians, however, undertook this buſineſs alſo, and on that account the duke of Lotharingia was ſtyled the Imperial Fire-maſter *. The firſt Germans who condeſcended to clean chimneys appear to have been miners; and our chimney-ſweepers ſtill procure boys from the foreſt of Hartz, who may be eaſily diſcovered by their language. The greater part of the chimney-ſweepers *(ramoneurs de cheminées)* in Paris, at preſent, are Savoyards; and one may ſee there every where in the ſtreets large groups of their boys †, many of whom are not above eight years of age, and who, clad in linen frocks, will, when called upon, ſcramble up at the hazard of their lives, with their beeſoms and other inſtruments, through a narrow funnel often fifty feet in length, filled with ſoot and ſmoke, and in which they cannot breathe till they arrive at the top, in order to gain five ſous; and even of this ſmall pittance they are obliged to pay a part to their avaricious maſters ‡.

HUNGARY

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* Ludwig über die guldene bulle, vol. ii. p. 653.

† — — — — Ces honnêtes enfans
Qui de Savoye arrivent tous les ans,
Et dont la main légérement eſſuye
Ces longs canaux, engorgés par la ſuie.

VOLTAIRE.

‡ C'eſt ainſi que ſe ramonent toutes les cheminées de Paris; et

des

HUNGARY WATER.

HUNGARY WATER is ſpirit of wine diſtilled upon roſemary, and which therefore contains its oily and ſtrong-ſcented eſſence. To be really good the ſpirit of wine ought to be very ſtrong and the roſemary freſh; and if that be the caſe, the leaves are as proper as the flowers, which according to the preſcription of ſome ſhould only be taken. It is likewiſe neceſſary that the ſpirit of wine be diſtilled ſeveral times upon the roſemary; but that proceſs is too troubleſome and expenſive to admit of this water being diſpoſed of at the low price it is uſually ſold for; and it is certain that the greater part of it is nothing elſe than common brandy, united with the eſſence of roſemary in the ſimpleſt manner. In general, it is only mixed with a few drops of the oil *. For a long time paſt this article has been brought to us principally from France, where it is prepared, particularly at Beaucaire, Montpellier, and other places in Languedoc,

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des régiſſeurs n'ont enrégimenté ces petits malheureux, que pour gagner encore ſur leur médiocre ſalaire. Puiſſent ces ineptes et barbares entrepreneurs ſe ruiner de fond en comble; ainſi que tous ceux qui ont ſollicité des privileges excluſifs! *Tableau de Paris*. Hamburg 1781, tom. ii. p. 249.

[*] Pomets Aufrichtiger materialiſt, Leipzig 1717. fol. p. 232. Neumanns Chemie, vol. iv. p. 122.

guedoc, in which that plant grows in great abundance.

The name, *l'eau de la reine d'Hongrie*, ſeems to ſignify that this water, ſo celebrated for its medicinal virtues, is an Hungarian invention; and we read in many books that the receipt for preparing it was given to a queen of Hungary by a hermit, or, as others ſay, by an angel, who appeared to her in a garden all entrance to which was ſhut, in the form of a hermit or a youth *. Some call the queen St. Iſabella †; but thoſe who pretend to be beſt acquainted with the circumſtance affirm that Elizabeth wife of Charles Robert king of Hungary, and daughter of Uladiſlaus II king of Poland, who died in 1380 or 1381, was the inventreſs. By often waſhing with this ſpirit of roſemary, when in the ſeventieth year of her age, ſhe was cured, as we are told, of the gout and an univerſal lameneſs; ſo that ſhe not only lived to paſs eighty, but became ſo lively and beautiful that ſhe was courted by the king of Poland, who was then a widower, and who wiſhed to make her his ſecond wife.

John George Hoyer ‡ ſays that the receipt for preparing this water, written by queen Elizabeth's own hand, in golden characters, is ſtill preſerved in the Imperial library at Vienna. But it has been already remarked by others * that Hoyer is miſtaken, and that he does not properly remember the account given of the receipt. It is to be found for the firſt time, as far as I know, in a ſmall book by John Prevot, which, after his death in 1631, was publiſhed by his two ſons at Francfort in 1659 †. Prevot, who in his writings diſcovers

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* Univerſal lexicon, vol. xlix. p. 1340.

† Traité de la chemie, par N. le Febure. Leyde 1669. 2 vol. 12mo. i. p. 474.

‡ In his notes to Blumentroſts Haus-and-reiſe-apotheke. Leipzig 1716, 8vo. cap. 16. p. 47.

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* Succincta medicorum Hungariæ et Tranſilvaniæ biographia, ex adverſariis Stephani Weſzpremi. Centuriæ duo. Pars prior. Wiennæ 1778. 8vo. p. 213. Pauli Wallaſzky Conſpectus reipublicæ litterariæ in Hungaria. Poſonii et Lipſiæ 1785, 8vo. p. 72.

† Selectiora remedia multiplici uſu comprobata, quæ inter ſecreta medica jure recenſeas. Auctore *Joanne Prævotio*, Rauraco, in Patav. gymnaſio olim medicinæ practicæ profeſſore, et horti medici præfecto. Libellus poſthumus a *Joan. Bapt.* et *Theob.* auctoris fil. in lucem editus. 12mo. In page 6 the following paſſage occurs: For the gout in the hands and the feet. As the wonderful virtue of the remedy given below has been confirmed to me by the caſes of many, I ſhall relate by what good fortune I happened to meet with it. In the year 1606 I ſaw among the books of Francis Podacather, of a noble Cyprian family, with whom I was extremely intimate, a very old breviary, which he held in high veneration becauſe, he ſaid, it had been preſented by St. Elizabeth, queen of Hungary, to ſome of his anceſtors as a teſtimony of the friendſhip which ſubſiſted between them. In the beginning of this book he ſhewed me a remedy for the gout written by the queen's own hand, in the following words, which I copied:

"I Elicovers a bias to credulity and ſuperſtition, gives a receipt againſt the gout in the feet and hands, which is exactly the ſame as that for making the Hungary water; and ſays that he found it at the beginning of a breviary, which had belonged to St. Elizabeth, queen of Hungary, in her own hand-writing. This breviary was in the poſſeſſion of Francis Podacather, a nobleman from Cyprus, to whoſe anceſtors it had been given as a memorial by the queen herſelf.

One may eaſily ſee that Prevot miſtook this Elizabeth for St. Elizabeth, the daughter of king

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" I Elizabeth, queen of Hungary, being very infirm and much troubled with the gout in the ſeventy-ſecond year of my age, uſed for a year this receipt given to me by an ancient hermit whom I never ſaw before nor ſince, and was not only cured but recovered my ſtrength, and appeared to all ſo remarkably beautiful, that the king of Poland aſked me in marriage, he being a widower and I a widow. I however refuſed him for the love of my Lord Jeſus Chriſt, from one of whoſe angels I believe I received the remedy. The receipt is as follows:

> " R. Take of aqua vitæ, four times diſtilled, three parts, and of the tops and flowers of roſemary two parts: put theſe together in a cloſe veſſel, let them ſtand in a gentle heat fifty hours, and then diſtil them. Take one dram of this in the morning once every week, either in your food or drink, and let your face and the diſeaſed limb be waſhed with it every morning.

" It renovates the ſtrength, brightens the ſpirits, purifies the marrow and nerves, reſtores and preſerves the ſight, and prolongs life." Thus far from the Breviary.—Then follows a confirmation which Prevot gives from his own experience.

Andrew

Andrew II, who was never queen of Hungary, but died wife of a landgrave of Thuringia in 1235. But reſpecting Elizabeth, the wife of king Charles Robert, we know from the information of Hungarian writers * that, in her will, ſhe really did mention two breviaries, one of which ſhe bequeathed to her daughter-in-law, and the other to one Clara von Pukur, with this ſtipulation, however, that after her death it ſhould belong to a monaſtery at Buda. It is not impoſſible, therefore, that one of theſe books may have come into the hands of Podacather's anceſtors.

I muſt however confeſs, that reſpecting this pretended invention of the Hungarian queen I have doubts which my learned friend profeſſor Cornides at Peſt can beſt reſolve. It may be readily conjectured that this Elizabeth muſt have been extremely vain; but when ſhe wiſhed to make poſterity believe that in the ſeventieth, or ſeventy-ſecond, year of her age ſhe became ſo ſound and ſo beautiful that a king, at that time a widower, grew enamoured of her, we may juſtly conclude that ſhe was more than vain—that ſhe was perhaps childiſh. I have taken the trouble to ſearch for the king, then a widower, who paid his addreſſes to Elizabeth, but my labour has proved fruitleſs. This propoſal of marriage muſt have been made

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* Medicorum Hungariæ biographia, *ut ſupra*, p. 214.

about the year 1370 *; but Caſimir III, brother of the Hungarian Elizabeth, reigned in Poland till that year, and was ſucceeded by her ſon Louis, who died after her in 1382; and the throne then remained vacant for three years †.

It is rather ſingular that the name of aqua-vitæ, and the practice of diſtilling ſpirit of wine upon aromatic herbs, ſhould be known in Hungary ſo early as the fourteenth century, though I will not pretend to affirm the contrary. But I conſider it as more remarkable that the botaniſts of the preceding century ſhould have ſpoken of and extolled the various properties of roſemary without mentioning Hungary water. It cannot, however, be denied that, in the ſixteenth century, long before Prevot, Zapata ‡, an Italian phyſician, taught the method

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* In Schwandtner's *Scriptores rerum Hungaricarum*, publiſhed ſince 1746 in three volumes folio, the year 1381 is given, vol. i. p. 766, as the period of Elizabeth's death; but in vol. iii. p. 723, the year 1380 is mentioned.

† Hubner's Genealogiſche tabellen, i. p. 95.

‡ The book of Zapata, who is not noticed in the *Gelehrten Lexicon*, was printed at Rome, as Haller ſays in his *Biblioth. botan.* vol. i. p. 368, in the year 1586; and other editions are mentioned in *Boerhavii Methodus ſtudii medici*, p. 728 and 869. I have now before me, from the library of Dr. Murray, *Job. Bapt. Zapatæ, medici Romani, Mirabilia ſeu ſecreta medico-chirurgica - - per Davidem Spleiſſium.* Ulmiæ 1696. The paſſage above alluded to occurs in page 49, as follows: Ab Arnoldo de Villa Nova vinum roſmarini

method of preparing ſpirit of roſemary: and he has even told us that it was known, though imperfectly, to Arnoldus de Villa Nova; but he does not ſay that it was an Hungarian invention. It appears to me moſt probable, at preſent, that the name, *l'eau de la reine d'Hongrie*, was choſen by thoſe who in latter times prepared ſpirit of roſemary for ſale, in order to give greater conſequence and credit to their commodity; as various medicines, ſome years ago, were extolled in the gazettes under the title of Pompadour, though the celebrated lady from whoſe name they derived their importance, certainly neither ever ſaw them nor uſed them.

roſmarini magnis laudibus celebratum componebatur, qui, ut encomii cumulum ei adderet, de Anaxagora memorat, quod in Babylone degens, ex medico quodam Saraceno ſatis decrepito, virtutem roſmarini ſummis precibus percontatus, ab ipſo id reſponſi tulerit: ſe nec cuiquam ſecretum ſibi ſuſpiciendum revelaturum ---- Recipe igitur muſtum bonum, ſcilicet lixivium ſponte defluens, antequam calcentur uvæ; cui vaſi commiſſo, adde ſtatim cymatum et foliorum roriſmarini partem decimam, et ſicut cum aliis fieri ſolet vinis, ſcutella perforata tegatur, ut efferveſcat et roriſmarini virtutes extrahat. Si vero lubet, poſtquam aliquid muſti et roriſmarini in cucurbita vitrea, cujus beneficio alias quinta eſſentia eſt deſtillanda, ſimul ebullierit, quintam eſſentiam inde elicere; id fieri poterit: et poſtquam deſtillata fuerit, in vas muſtum alterum cum roremarino, jam continens, poſt hujus fermentationem, eſt infundenda. Addita enim tam modica quintæ eſſentiæ hac quantitate, muſtum eo fragrantius et efficacius reddetur.

CORK.

THOSE who are accuſtomed to value things uſed in common life, only according to the price for which they can be purchaſed, will perhaps imagine that my ſubject muſt be nearly exhauſted when I think it worth my while to entertain my readers with a matter ſo inconſiderable. Cork, however, is a ſubſtance of ſuch a ſingular property, that one has not yet been found which can be ſo generally employed with the ſame advantage; and before the uſe of it was known, people were obliged on many occaſions to ſupply the want of it by means which to us would appear extremely troubleſome.

Cork is a body remarkably light, can be eaſily compreſſed, expands again by its elaſticity as ſoon as the compreſſing power is removed, and therefore fills or ſtops up very cloſely that ſpace into which it has been driven by force. It may be eaſily cut into all forms; and though it abounds with pores, which are the cauſe of its lightneſs, it ſuffers neither water, beer, nor any common liquid to eſcape through it, and it is only very ſlowly and after a conſiderable length of time that it can be penetrated even by ſpirits. Its numerous pores ſeem to be too ſmall to afford a paſſage to the fineſt particles of water and wine, which can with greater facility ooze through more compact wood that has larger or wider pores.

Cork is the exterior bark of a tree belonging to the genus of the oak, which grows wild in the ſouthern parts of Europe, particularly France, Spain, Portugal, and Tuſcany *. When the tree is about fifteen years old, it is fit to be barked, and this can be done ſucceſſively for eight years. The bark always grows up again, and its quality improves as the age of the tree increaſes. It is commonly ſinged a little over a ſtrong fire or glowing coals, or laid to ſoak a certain time in water, after which it is placed under ſtones in order to be preſſed ſtraight. We procure the greater part of our cork from the Dutch, who bring it principally from France; but they import ſome alſo from Portugal and Spain.

This tree, as well as its uſe, was known to the Greeks and the Romans. By the former it was called *phellus*. Theophraſtus reckons it among the oaks, and ſays that it has a thick fleſhy bark, which muſt be ſtripped off every three years to prevent it from periſhing. He adds, that it was ſo light as never to ſink in water, and on that account could be uſed with great advantage for a variety of purpoſes *. The only circumſtance that on the firſt conſideration can excite any doubt of the *phellus* being our cork-tree, is, that he expreſsly ſays it loſt its leaves annually, whereas our cork-tree retains them †. In another paſſage, however, he calls it an ever-green ‡. This apparent contradiction ſeveral commentators have endeavoured to clear up, but their labour ſeems unneceſſary; for there is a ſpecies of our cork-tree which really drops its leaves. Linnæus did not think this ſpecies worth his notice; but it has been accurately obſerved by Cluſius and Matthiolus *, and its exiſtence is confirmed by Miller †. As Theophraſtus ‡, Pliny ||, Varro §, and others mention a common oak which always retains its leaves, it appears clear to me that the firſt-mentioned author meant, where he ſpeaks of ever-greens, our common ſpecies of the cork-tree, and that extraordinary kind of cork; but in the other paſſage that ſpecies which drops its leaves in winter.

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* Duhamel, Abhandlung von bäumen und ſtauden, i. p. 223. Tozzetti, Viaggii, iv. p. 278.

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* Folio non perpetuo, ſed deciduo. Fructum fert aſſidue, eumque glandis figura ilicis feminæ ſimilem. Detrahunt corticem, univerſumque dividendum cenſent; alioquin arborem deteriorem effici volunt. Rurſum vero intra triennium repletur. *Hiſtor. Plantar.* lib. iii. cap. 16. He repeats the ſame thing lib. iv. cap. 18, where he remarks as an exception, that the cork-tree does not die after it has loſt its bark, but becomes more vigorous. In the ſouthern parts of France the cork-trees are barked every eight, nine or ten years.

† Ουκ αειφυλλον, αλλα φυλλοϐολουν.

‡ Lib. iii. cap. 4. This difficulty the commentators have endeavoured to remove by reading here φελλοδρυς inſtead of the two words φελλος and δρυς which are ſeparated; and indeed φελλοδρυς occurs in other parts of the ſame work among the ever-greens, lib. i. cap. 15, και ἣν Αρκαδες καλουσι φελλοδρυν.

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* Cluſius in Rar. plantar. hiſtor. lib. i. cap. 14, deſcribes this tree as he found it without leaves in the month of April in the Pyrenees near Bayonne. Theophraſtus, p. 234, ſays, The cork-tree, φιλλος, which drops its leaves γινεται εν Τυῤῥηνια: but the Aldine manuſcript and that of Baſle have Πυῤῥηνια. The latter reading is condemned by Robert Conſtant. and others: but though the cork-tree is indeed indigenous in Tyrrhenia or Hetruria, I ſee no reaſon why Πυῤῥηνια ſhould not be retained, as it is equally certain that the tree grows in the Pyrenees, and that it there loſes its leaves according to the obſervation of Cluſius. If on the other hand we read Τυῤῥηνια, this is oppoſed by the experience of Theophraſtus; for in Italy as well as in France and Spain the tree keeps its leaves the whole winter through. Stapel therefore has preferred the word Πυῤῥηνια. Labat, who ſaw the tree both in the Pyrenees and in Italy, ſays in his *Reiſe nach Welſchland*, i. p. 305, that in the former it drops its leaves in winter, and in the latter preſerves them.

† In his Gardener's Dictionary. Bauhin, in his *Pinax*, p. 424, mentions this ſpecies particularly.

‡ Hiſtoria plantarum, lib. i. cap. 15.

|| Lib. xvi. cap. 21.

§ De re ruſtica, i. cap. 7.

That the *ſuber* of the Romans was our cork-tree is generally and with juſtice admitted. Pliny relates of it, in the cleareſt manner, every thing ſaid by Theophraſtus * of the *phellus* †; and we find by his account, that cork at the period when he wrote was applied to as many purpoſes as at preſent ‡.

At that time fiſhermen made floats to their nets of cork; that is, they affixed pieces of cork to the rope which formed the upper edge of the net, and which it was neceſſary ſhould be kept at the ſurface of the water, in the ſame manner as is done at preſent *. The high price of cork, however, limited this uſe very much; and ſmall boards of light wood, ſuch as that of the pine, aſpen-tree, lime-tree and poplar were employed in its ſtead †. The German and Swediſh fiſhermen, and alſo the Coſſacks, uſe for the ſame purpoſe the bark of the black poplar; but the Dutch and Hanoverians, who fiſh on the Weſer, employ for their nets a kind of wood called in Holland *toll-hout*. It is a wood of a reddiſh brown colour, extremely light, and of a very fine grain, which the Dutch, who export it to Germany, procure from the Baltic. At Amſterdam it coſts a ſtiver per pound; but I have not yet been able to learn what wood it properly is.

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* Lib. xvi. cap. 8.

† The botaniſts of the laſt century, who paid more attention to the names of the ancients than thoſe of the preſent century, ſay that the cork-tree is in Greek called alſo ἴψος, or ἰψὸς, which word is not to be found in Erneſt's dictionary. I have found it only once in Theophraſtus, *Hiſtor. plantar.* lib. iii. cap. 6, where thoſe plants are named which blow late. Becauſe Pliny, lib. xvi. cap. 25, ſays, *tardiſſimo germine ſuber*; ἴψος is conſidered to be the ſame as φελλὸς. Heſychius however ſays, that ἰψὸς in ſome authors ſignifies ivy.

‡ Our German word *kork*, as well as the ſubſtance itſelf, came to us from Spain, where the latter is called *chorcha de alcornoque*. It is, without doubt, originally derived from *cortex* of the Latins, who gave that appellation to cork without any addition. Horace ſays, Od. iii. 4: *Tu levior cortice*; and Pliny tells us: *Non infacete Græci (ſuberem) corticis arborem appellant*. Theſe laſt words are quoted by C. Stephanus in his *Prædium ruſticum*, p. 578, and *Ruellius de natura ſtirpium*, p. 174, and again p. 256, as if the Greeks called the women, on account of their cork ſoles, of which I ſhall ſpeak hereafter, *cortices arborum*. This gives me reaſon to conjecture a different reading in Pliny, and indeed I find in the ſame edition which, as I have already obſerved, I received as a preſent from profeſſor Bauſe at Moſcow, the words *cortices arborum*. This variation ought to have been remarked by Hardouin.

Another uſe to which cork was applied, according to Pliny, was for anchor-buoys. *Uſus ejus ancoralibus maxime navium.* Theſe words Hardouin

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[*] Plin. p. 7: Uſus ejus piſcantium tragulis. *Tragulæ* therefore were what our fiſhermen call floats. *Suidas*: Phellos immerſabilis aquis, ſemper occultum rete piſcatorium quaſi ſorte indicans. *Sidonius, Epiſt.* lib. ii. 2: Piſcator retia ſuberinis corticibus extendit. How floats are made at preſent may be ſeen by fig. 701 in Krunitz, Œconom. encyclopedie, vol. xiii.

[†] Linnæi Flora Suec. p. 358. Gmelin (junior), Reiſe durch Ruſsland, i. p. 138. It is a miſtake in *Duroi*, *Harbkeſcher baumzucht*, ii. p. 141, that ropes for fiſhing-nets are prepared from this bark.

has not explained; and Scheffer [*], where he ſpeaks of anchors, and what belongs to them, takes no notice of cork. Geſner, however, has attempted an explanation [†], but what he ſays is, in my opinion, not ſatisfactory. He certainly could not mean that it was employed to render anchors lighter.—According to my idea, they may be eaſily made light enough without cork, and perhaps they can never be made too heavy. The true explanation of this paſſage is, that it was uſed for making buoys, called *ancoralia*, which were fixed to the cable, and by floating on the ſurface of the water, over the anchor, pointed out the place where it lay [‡]. Our navigators uſe for that purpoſe a large but light block of wood, which, in order that it may float better, is often made hollow [||]. A large caſk is alſo ſometimes employed. The Dutch ſailors call theſe blocks of wood *boei* or *boeye*; and hence comes their proverb: *Hy beeft een kop als een boei*, he has a head like a buoy; he is a blockhead.

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[*] De militia navali veterum. Upſaliæ 1654, 4to. lib. ii. cap. 5.

[†] In Stephen's Theſaurus he ſays: Uſus ancoralibus navium; int. ſuſtinendis, et minuendo pondere ancorarum.

[‡] The following words of Pauſanias, viii. 12. p. 623, where he ſpeaks of the different kinds of oak in Arcadia, may ſerve to ſupport my explanation. Some, ſays he, have a bark ſo light ωϛε απ’ αυτου και εν θαλασσῃ ποιουνται σημεια αγκυραις και δικτυοις; ut ex eo anchorarum in mari indices et fundarum (retium) faciant.

[||] And to conceal contraband goods in them, of which I have ſeen inſtances during my travels.

A third uſe of cork among the Romans was its being made into ſoles, which were put into their ſhoes in order to ſecure the feet from water, eſpecially in winter*; and as high heels were not then introduced, the ladies who wiſhed to appear taller than they had been formed by nature, put plenty of cork under them †.

The practice of employing cork for making jackets to aſſiſt one in ſwimming, is alſo very old; for we are informed that the Roman whom Camillus ſent to the Capitol when beſieged by the Gauls, put on a light dreſs, and took cork with him under it, becauſe, to avoid being taken by the enemy, it was neceſſary that he ſhould ſwim through the Tiber. When he arrived at the river, he bound his clothes upon his head, and, placing the cork under him, was ſo fortunate as to ſucceed in his attempt ‡.

The

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* Uſus præterea in hiberno feminarum calceatu. Plin.

† Xenophon de tuenda re famil. and Clemens Alexand. lib. iii. pædag.

‡ Plutarchus in vita Camilli: Εσθητα δε φαυλην εχων, και φελλους ὑπ’αυτῃ κομιζων, την μεν αλλην ὁδον ἡμερας αδεως διηλθεν. Εγγυς δε της πολεως γενομενος ηδη σκοταιος, επει κατα γεφυραν ουκ ην τον ποταμον περασαι, των βαρβαρων παραφυλλαττοντων, την μεν εσθητα τῃ κεφαλῃ περισπειρασας, ου πολλην ουσαν ουδε βαρειαν, τοις δε φελλοις εφεις το σωμα και συνεπικουφιζων τω περαιουσθαι, προς την πολιν διαβη. In the

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The moſt extenſive and principal uſe of cork at preſent, is for ſtoppers to bottles. This was not entirely unknown to the Romans, for Pliny ſays expreſsly, that it ſerved to ſtop veſſels of every kind *; and inſtances of its being employed for that purpoſe may be ſeen in Cato † and Horace ‡. Its application to this uſe, however, ſeems not to have been very common, elſe cork-ſtoppers would have been oftener mentioned by the authors who have written on agriculture and cookery, and alſo in the works of the ancient poets. We every where find directions given to cloſe up wine caſks and other veſſels with pitch, clay, gypſum, or potters-earth, or to fill the upper part of the veſſel with oil or honey, in order to exclude the air from thoſe liquors which one wiſhed to preſerve ‖. In the

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tenth volume of the *Algemeine Welthiſtorie* (Univerſal Hiſtory), page 306, where this circumſtance is copied from Plutarch, it is ſaid improperly, that Cominius (ſo the adventurer was called) uſed ſandal-wood, which certainly would have afforded him no aſſiſtance.

* Uſus ejus cadorum obturamentis.

† Muſtum ſi voles totum annum habere, in amphoram muſtum indito, et corticem oppicato. *De re ruſtica*, cap. 120.

‡ Corticem adſtrictum pice dimovebit,
Amphoræ. Lib. iii. od. 8, 10.

‖ As proofs of this may every where be found, it is hardly worth while to quote them. *Columella*, xii. 12, teaches the manner of preparing cement for ſtopping up wine caſks. Liſter ſays the paſſages therefore already quoted, where cork is named, mention is made alſo of pitching. The reaſon of this I believe to be, that the ancients uſed for their wine large earthen veſſels with wide mouths, which could not be ſtopped ſufficiently cloſe by means of cork. Wooden caſks were then unknown, or at leaſt ſcarce, as Italy produced little timber, otherwiſe theſe veſſels would have been ſtopped with wood, as is the caſe at preſent. The practice of drawing off wine for daily conſumption, from the large veſſels into which it is firſt put, into ſuch ſmaller veſſels as can be eaſily corked, was then not prevalent *. The ancients drew off from their large jars into cups or pitchers

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ſays, in a note on *Apicius*, chap. 17: Vitrea noſtra vaſa ſubere, vel oleo, vel utroque diligenter obturata longe commodiora ſunt ipſis antiquis artificiis, et æque ſecura ad omnem aeris ingreſſum prohibendum. The earthen wine-jars found at Pompeii appear to have had oil poured over them, and to have had no other care beſtowed upon them. In Italy, even at preſent, large flaſks have no ſtoppers, but are filled up with oil. See *Martini Auſlebendes Pompeii*, p. 121, and Hamilton's *Entdeckungen zu Pompeii*, tranſlated by von Murr. Nurnberg 1780, 4to. p. 19.

* Alexand. ab Alex. Dier. gen. v. 21. p. 302. Antiquiſſimi (ut Varro ait) primo utres, deinde tinas, demum vini amphoras et cupas apposuere. When the Romans went out to the chace, they carried with them ſome wine in a *laguncula*. *Plin. Epiſt.* i. 6. p. 22. Cum venabere, licebit auctore me, ut panarium et lagunculam, ſic etiam pugillares feras. I do not know however, that theſe flaſks were of glaſs; all thoſe I have ſeen were made of clay or wood. See *Pompa de inſtrum. fundi*, cap. 17, in the end of Geſner's edition of *Scriptores rei ruſt.* ii. p. 1187.

whatever quantity of wine they thought neceſſary for the time, inſtead of which the moderns uſe bottles. It appears to have been cuſtomary at the French court, about the year 1258, when grand entertainments were given, and more wine veſſels had been opened than were emptied, that the remainder became a perquiſite of the *grand-bouteiller* *.

Stoppers of cork ſeem to have been firſt introduced after the invention of glaſs-bottles, and of theſe I find no mention before the fifteenth century; for the *amphoræ vitreæ diligenter gypſatæ* of Petronius †, to the necks of which were affixed labels, containing the name and age of the wine, appear to have been large jars, and to have formed part of the many uncommon articles by which the voluptuary Trimalchio wiſhed to diſtinguiſh himſelf. It is however ſingular, that theſe convenient veſſels were not thought of at an earlier period, eſpecially as among the ſmall funereal urns of the ancients, many are to be found which in ſhape reſemble our bottles *. In the figure of the Syracuſan wine-flaſks, I think I can diſcover their origin from theſe urns. Charpentier † quotes, from a writing of the year 1387, an expreſſion which ſeems to allude to one of our glaſs-bottles; but, when attentively conſidered, it may be eaſily diſcovered that cups or drinking-glaſſes are meant. The name *boutiaux*, or *boutilles*, occurs in the French language for the firſt time in the fifteenth century; but were it even older, it would prove nothing, as it ſignified originally, and even ſtill ſignifies, veſſels of clay or metal, and particularly of leather ‡. Such veſſels filled with wine, which travellers were accuſtomed to ſuſpend from their ſaddles, could be ſtopped with a piece of wood, or cloſed by means of wooden or metal tops ſcrewed on them, which are ſtill uſed for earthen-pitchers. In the year 1553, when C. Stephanus wrote his *Prædium ruſticum*, cork-ſtoppers muſt have been very little known, elſe he would not have ſaid that in his time cork in France was uſed principally for ſoles [*]. In the time of Lottichius, rich people however had glaſs-flaſks, with tin mouths, which could be ſtopped ſufficiently cloſe without cork; and theſe flaſks appear to have been as thin as the Syracuſan wine-bottles; for he adds that it was neceſſary to wrap them round with ruſhes or ſtraw [†]. In the ſhops of the apothecaries in Germany, cork ſtoppers began firſt to be uſed about the end of the laſt century. Before that period they uſed ſtoppers of wax, which were not only much more expenſive but alſo far more troubleſome [‡].

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* Le Grand d'Auſſy, Hiſtoire de la vie privée des François, ii. p. 367.

† Petron. Sat. cap. xxxiv. p. 86. Statim allatæ ſunt amphoræ vitreæ diligenter gypſatæ, quarum in cervicibus pittacia erant adfixa cum hoc titulo, &c. In the paintings of Herculaneum I find many wide-mouthed pitchers, with handles, like decanters, but no figure that reſembles our flaſks.

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* Aringhi Roma ſubterranea. Romæ 1651, fol. i. p. 502. where may be ſeen an account of a flaſk with a round belly and a very long neck.

† Gloſſarium novum, i. p. 1182: le dit Jaquet print un contouffle de voirre, ou il avoit du vin, - - - - et de fait en but.

‡ Grand d'Auſſy quotes from *Chronique ſcandaleuſe de Louis* XI, "Des bouteilles de cuyr." That word however is of German extraction, though we have received it back from the French ſomewhat changed, like many other German things. It is evidently derived from *butte*, *botte*, *buta*, *buticula*, *buticella*, which occur in the middle ages. See *C. G. Schwarzii Exercitat. de Butigulariis*. Altorfii 1723, 4to. p. 5.

In latter times, ſome other vegetable productions have been found which can be employed inſtead of cork for the laſt-mentioned purpoſe.

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[*] Cortex ad nos plurimus defertur, muniendis adverſus frigoris injuriam hieme calceamentis. p. 578.

[†] In his obſervations on Petronius, p. 259, he ſays: Olim utribus vinum aſſervabant. - - - - Hodie adhuc ditiores amphoris vitreis ſtanneo orificio obſeratis communiter utuntur, quod vinum in illis rectius ſervetur, neque odorem contrahat, ſicut in ſtanneis aliiſque vaſibus uſu venit. Accedit, quod mundiores ſunt vitreæ, quia tranſparent, ſecus quam in ſtanneis accidit. Interim vitreæ amphoræ ſcorteo operimento vel involucro opus habent, ne frangantur citius; vulgo dicunt, *ein flaſchenſuder*, a flaſket.

[‡] Neumann, in his Chemiſtry, publiſhed by Keſſel, vol. iv. p. 308. The uſe of corks, ſays he, in the ſhops of the German apothecaries is not above forty years old.

Among theſe is the wood of a tree common in South America, particularly in moiſt places, which is called there *monbin* or *monbain*, and by botaniſts *ſpondias lutea*. This wood is brought to England in great abundance for that uſe. The ſpongy root of a North American tree, known by the name of *nyſſa*, is alſo uſed for the ſame end *, as are the roots of liquorice, which on that account is much cultivated in Sclavonia, and exported to other countries †.

APOTHECARIES.

THE hiſtory of the materia medica is a ſubject fit to be undertaken only by phyſicians like Baldinger, Henſler, Mohſen ‡ and Gruner, who to an intimate acquaintance with what belongs to their own profeſſion, have united a knowledge of every other branch of ſcience. By making this acknowledgment, I wiſh to guard myſelf from the imputation of vanity, which I might incur as attempting to incroach on the province of ſuch learned men. That however is not the caſe. My intention is only to lay before the public what I have collected reſpecting this ſubject, becauſe I have reaſon to flatter myſelf, that, however trifling, it may be of ſome uſe until a complete hiſtory be obtained; and becauſe I may have met with ſome ſcattered information, which, without my reſearch, might have eſcaped the notice of abler writers. Whoever is acquainted with ſuch labour, will at any rate allow that this is poſſible; and I hope the following eſſay towards a hiſtory of apothecaries will not prove unacceptable to my readers.

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* Die neuere wilde baumzucht in einem alphabetiſchen verzeichniſſe aufgeſtellet. Leipzig 1782, 8vo. p. 30. The author is C. F. Ludewig at Leipſic.

† B. F. Hermann's Abritz der Oeſterreichiſchen ſtaaten. St. Peterſburg und Leipzig, 1782, 8vo. p. 321.

‡ Dr. Mohſen has already publiſhed a conſiderable part of what belongs to this ſubject in his *Geſchichte der Wiſſenſchaften in der Mark Brandenburg, beſonders der Arzneywiſſenſchaft.* Berlin 1781, 4to. p. 372. Some information alſo reſpecting the hiſtory of apothecaries may be found in *Chriſt. Thomaſii Diſſert. de jure circa pharmacopolia civitatum.* This work is printed in the ſecond volume of his *Diſſertationes academicæ*, publiſhed at Halle in 1774, 4 vol. quarto.

That the Greek and Roman phyſicians prepared themſelves thoſe medicines which they preſcribed for their patients, is ſo well known, that I think it unneceſſary to produce proofs with which no one can be unacquainted who has read Theophraſtus, Hippocrates and Galen. They cauſed thoſe herbs, of which almoſt the whole materia medica then conſiſted, to be collected by others; and we have reaſon to believe that the gathering and ſelling of medicinal plants muſt have at an early period been converted into a diſtinct employment, eſpecially as, many of them being exotics, it was neceſſary to procure them from remote countries, which every phyſician had not an opportunity of viſiting; and as ſome of them were applied to a variety of purpoſes, they were ſought after by others as well as by medical practitioners. Several of them were employed in cookery and for ſeaſoning different diſhes, many in dyeing and painting, ſome of them as coſmetics, others for perfumes, ſome for ointments, which were much uſed in the numerous baths, and not a few of them may have been employed alſo in other arts and manufactures. It muſt have been very convenient for the phyſicians to purchaſe what articles they had occaſion for from theſe dealers in herbs; but it is probable, and can even be proved, that theſe people ſoon injured them in their profeſſion, by encroaching on their buſineſs. In the courſe of time they acquired a knowledge of the healing virtues of their commodities, and of the preparation they required, which was then extremely ſimple; and many of them began to ſell compounded medicines, and to boaſt of poſſeſſing ſecrets more beneficial to mankind. To theſe dealers in herbs belong the *pigmentarii*, *ſeplaſiarii*, *pharmacopolæ*, *medicamentarii*, and others who were perhaps thus diſtinguiſhed by diſtinct names on account of ſome very trifling circumſtances in which they differed, or by dealing in one particular article more than in another. Some of theſe names alſo may poſſibly have been uſed only at certain periods, or in ſome places more than in others; and perhaps it would be fruitleſs labour to attempt to define their difference correctly. That the *pigmentarii* dealt in medicines is proved by the law which eſtabliſhed a puniſhment for ſuch as ſold any one poiſon through miſtake [*]. The herbs which Vegetius [†] preſcribes for the diſeaſes of cattle were to be bought from the *ſeplaſiarii*; and that they ſold alſo medicines ready prepared is proved by the reproach thrown out by Pliny againſt the phyſicians of his time, that inſtead of making up their medicines themſelves, as formerly, they purchaſed them, without ſo much as knowing of what they were compoſed, from the *ſeplaſiarii* [‡]. That the *pharmacopolæ* carried on a like trade appears evident from their name; but people of judgment placed no confidence in them, and they were deſpiſed on account of their impudent boaſting, and the extravagant praiſes they beſtowed on their commodities [*]. The *medicamentarii* do not often occur, but we are given to underſtand by Pliny [†], that they followed an employment of the ſame nature; and it appears that they muſt have been very worthleſs, for in the Theodoſian code, male and female poiſoners are called *medicamentarii* and *medicamentariæ* [‡].

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[*] Alio ſenatuſconſulto effectum eſt, ut pigmentarii, ſi cui temere cicutam, ſalamandram, aconitum - - - - - - et id quod luſtramenti cauſa dederint cantharidas, pœna teneantur hujus legis. *Digeſt.* lib. xlviii. tit. 8, 3, 3.

[†] Panacem a ſeplaſiariis comparas. *De mulomedic.* iii. 2, 21. p. 1107.

[‡] Hæc omnia medici (quod pace eorum dixiſſe liceat) ignorant, pars major et nomina; in tantum a conficiendis medicaminibus abſunt, quod eſſe proprium medicinæ ſolebat. Nunc quoties incidere in libellos, componere ex his volentes aliqua, hoc eſt, impendio miſerorum experiri commentaria, credunt Seplaſiæ omnia fraudibus corrumpenti. Jam quidem facta emplaſtra et collyria mercantur, tabeſque mercium, aut fraus Seplaſiæ ſic exteritur. *Plin.* lib. xxxiv. cap. 11.

It may be readily perceived that theſe herb-dealers had a greater reſemblance to our grocers, druggiſts, or mountebanks, than to our apothecaries. It is well known that the word *apotheca* ſignified any kind of ſtore, magazine, or warehouſe, and that the proprietor or keeper of ſuch a ſtore was called *apothecarius* [‖]. It would be a very great miſtake, therefore, if in writings of the thirteenth and fourteenth century, where theſe expreſſions occur, we ſhould underſtand under the latter apothecaries ſuch as ours at preſent *. At theſe periods, thoſe were often called apothecaries who at courts and in the houſes of great people prepared for the table various preſerves, particularly fruit incruſted with ſugar, and who on that account may be conſidered as confectioners. What peculiarly diſtinguiſhes our apothecaries is, that they ſell drugs uſed in medicine, and prepare from them different compounds according to the preſcriptions given by phyſicians and others. But here ariſes a queſtion: When did phyſicians begin to give up entirely the preparation of medicines to ſuch apothecaries, who muſt now be more than herb-

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[*] Μιμειται που και φαρμακοπωλης ιατρον. Pharmacapola imitatur medicum, ſophiſta philoſophum, ſycophanta oratorem. *Maximus Tyrius*, diſſert. x. p. 121. Itaque auditis, non auſcultatis, tanquam pharmacopolam; nam ejus verba audiuntur, verum ei ſe nemo committit, ſi æger eſt. *Cato*, in Aulus Gellius, lib. i. cap. 15.

[†] Plin. lib. xix. cap. 6.

[‡] Homicidam aut medicamentarium maritum ſuum eſſe probare. - - - - - Uxorem mæcham vel medicamentariam probare. *Cod. Theodoſ.* iii. tit. 16.

[‖] Proofs of this may be found in Gloſſarium manuale, vol. i. p. 298. From the word *apotheca* the Italians have made *boteca*, and the French *boutique*.

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* In the *Nurnberger Bürgerbuch* mention is made of Mr. Conrade Apotheker, 1403; Mr. Hans Apotheker, 1427; and Mr Jacob Apotheker, 1433. See *Von Murr's Jornal der Kunſtgeſchichte*, vi. p. 79. Henricus Apothecarius occurs as a witneſs at Gorlitz, in a charter of the year 1439; and one John Urban Apotheker excited an inſurrection againſt the magiſtrates of Lauban in 1439. See *Buddæi Singularia Luſatica*, vol. ii. p. 424, 500. Dr. Mohſen very juſtly remarks, p. 378, that one cannot with any certainty determine whether theſe people were properly apothecaries. This obſervation muſt not be neglected in reading the following paſſage of Von Stetten in his *Kunſtgeſchichte der Stadt Augsburg*, p. 242. "In very old times there was a family here who had the name of Apotheker, and it is very probable that ſome of this family had kept a public apothecary's ſhop. Luitfried Apotheker, or *in der Apothek*, lived in the year 1285, and Hans Apotheker was in 1317 city chamberlain."

herb-dealers, and muſt underſtand chemiſtry? And when did the apothecaries acquire an excluſive title to that buſineſs and to their preſent name? It is probable that phyſicians gradually became accuſtomed to employ ſuch aſſiſtance for the ſake of their own convenience, when they found in their neighbourhood a druggiſt in whoſe ſkill they could confide, and whoſe intereſt they wiſhed to promote, by reſigning in his favour that occupation.

Conring aſſerts, without any proof, but not however without probability *, that the phyſicians in Africa firſt began to give up the preparation of medicines after their preſcriptions to other ingenious men; and that this was cuſtomary ſo early as the time of Avenzoar in the eleventh century. Should that be the caſe, it would appear that this practice muſt have been firſt introduced into Spain and the lower part of Italy, as far as the poſſeſſions of the Saracens then extended, by the Arabian phyſicians who attended the Caliphs or Arabian princes. It is probable therefore, that many Arabic terms of art were by theſe means introduced into pharmacy and chemiſtry, for the origin of which we are indebted to that nation, and which have been ſtill retained and adopted. Hence it may be explained why the firſt known apothecaries

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* Herm. Conringii de hermetica medicina libri duo. Helmſtadii 1669, 4to. p. 293.

were to be found in the lower part of Italy; but at any rate we have reaſon to conclude, that they obtained their firſt legal eſtabliſhment by the well known medicine edict of the emperor Frederic II. iſſued for the kingdom of Naples, and from which Thomaſius deduces the privileges they enjoy at preſent *. By that edict it was required that the *confectionarii* ſhould take an oath to keep by them freſh and ſufficient drugs, and to make up medicines exactly according to the preſcriptions of the phyſicians; and a price was fixed at which the *ſtationarii* might vend medicines ſo prepared, and keep them a year or two for ſale in a public ſhop or ſtore. The phyſicians at Salerno had the inſpection of the *ſtationes*, which were not to be eſtabliſhed in every place, but in certain towns. The *confectionarii* appear to have been thoſe who made up themſelves the medicines or *confectiones*. The *ſtatio* was the houſe where they were ſold, or, according to the preſent mode of expreſſion, the apothecary's-ſhop; and the *ſtationarii* ſeem to have been the proprietors, or thoſe who had the care of ſelling the medicines. The word *apotheca* ſeldom occurs in that edict; when it does it ſignifies the ware-houſe or repoſitory where the drugs were preſerved. I however find no proof in it that the phyſicians at that time ſent their preſcriptions to the *ſtationes* to be made up. It appears rather that the *confectionarii* prepared medicines from a general ſet of preſcriptions legally authoriſed, and that the phyſicians ſelected from theſe medicines, kept ready for uſe, ſuch as they thought moſt proper to be adminiſtered to their patients. A phyſician who had paſſed an examination, and obtained a licence to practiſe, was obliged to ſwear that he would obſerve *formam curiæ hactenus obſervatam*; and if he found *quod aliquis confectionarius minus bene conficiat*, he was obliged to give information to the *curia*. The *confectionarii* ſwore that they would make up *confectiones, ſecundum prædictam formam*. It was neceſſary that electuaries and ſyrups ſhould be accompanied with a certificate from a phyſician to ſhew that they were properly prepared. I muſt acknowledge that the edict alludes here only to ſome medicines commonly employed; but I am ſurpriſed that the preſcriptions are not mentioned, if ſuch were then in uſe. I have never had the good fortune to meet with the word *Receptum* uſed to ſignify a preſcription in any works of the above century. The practice of phyſicians writing out, almoſt every time, the method of preparing the medicines which they order, may perhaps have been introduced at a later period. The book of receipts moſt in uſe, by which the medicines of that time were made up, was, according to Dr. Mohſen *, the *Antidotarium*, which the phyſicians of Salerno cauſed to be collected and tranſlated into Latin from the works of the Arabian phyſician Meſues, and from thoſe of Avicenna, Galen, Actuarius, Nicolaus Myrepſius, and Nicolaus Præpoſitus, by the celebrated profeſſor in that city, Nicolaus di Reggio, a native of Calabria.

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* This edict may be found in *Lindenbrogii Codex legum antiquarum*, Francof. 1613, fol. p. 809, under the title *Conſtitutiones Neapolitanæ, ſeu Siculæ*. The law properly here alluded to, *de probabili experientia medicorum*, is by moſt authors aſcribed to the emperor Frederic I, but by Conring to his grandſon Frederic II. See *Conring. de antiquitatibus academicis*. Gottingæ 1739, 4to. p. 60.

If it be true that the ſeparation of pharmacy from medicine firſt took place in Africa, it is highly probable that the well-known Conſtantinus Afer may have contributed to introduce it alſo into Italy. This man, who was a native of Carthage, having learned the medical art from the Arabians, made it known in that country, particularly after the year 1086, when he was a Benedictine monk in a monaſtery ſituated on Mount Caſſino; and the ſervice which he rendered to the celebrated ſchool of phyſic in the neighbouring city of Salerno, is well known. After his time, many of the monaſteries applied themſelves to the preparing of medicines, which they diſtributed gratis to the poor, and ſold to the opulent, by which means they were much benefited in various reſpects.

It is well known that almoſt all political inſtitutions on this ſide the Alps, and particularly every thing that concerned education, univerſities and ſchools, were copied from Italian models. Theſe were the only patterns which were then to be had; and the monks, diſpatched from the papal court, who were employed in ſuch undertakings, clearly ſaw that they could lay no better foundation for the Pontiff's power and their own aggrandizement, than by inducing as many ſtates as poſſible to follow the examples ſet them in Italy. Medical eſtabliſhments were formed, therefore, every where at firſt according to the plan of that at Salerno. Particular places for vending medicines were more neceſſary, however, in other countries than in Italy. The phyſicians of that period uſed no other drugs than thoſe recommended by the ancients; and as theſe were to be procured only in the Levant, Greece, Arabia and India, it was neceſſary to ſend thither for them. Beſides, according to the aſtrological notions which then prevailed, herbs, to be confided in, could not be gathered but when the ſun and planets were in certain conſtellations, and certificates of their being ſo were requiſite to give them reputation. All this was impoſſible to be done without a diſtinct employment, for phyſicians were otherwiſe engaged. It was found convenient therefore to ſuffer ſome of the principal dealers in drugs gradually to acquire monopolies. The preparation of drugs was becoming always more difficult and expenſive. After the invention of diſtillation, ſublimation and other chemical proceſſes, laboratories, furnaces and coſtly apparatus were to be conſtructed, and it was proper that men who had regularly ſtudied chemiſtry ſhould alone follow pharmacy; and that they ſhould be indemnified for their expences by an excluſive trade. Theſe monopoliſts alſo could be kept under cloſer inſpection, by which the danger of their ſelling improper drugs or poiſon was leſſened or entirely removed. It would appear that no ſuſpicions were at firſt entertained, that apothecaries could amaſs riches by their employment, ſo ſoon and ſo eaſily as they do at preſent; for they were allowed many other advantages, and particularly that of dealing in ſweetmeats and confectionary, which were then the greateſt delicacies. In many places they were obliged on certain feſtivals to give preſents of ſuch dainties to the magiſtrates, by way of acknowledgment, and hence probably has ariſen the cuſtom of ſending new-years gifts of marchepanes and other things of the like kind.

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* Page 374.

In many places, and particularly in opulent cities, the firſt apothecaries' ſhops were eſtabliſhed at the public expence, and belonged to the magiſtrates. A particular garden alſo was often appropriated to the apothecary, in order that he might rear in it the neceſſary plants, and which therefore was called the apothecary's garden *. Apothecaries'

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* Theſe gardens in moſt cities have been revoked, but they ſtill

caries' ſhops for the uſe of courts were frequently eſtabliſhed and directed by the conſorts of princes; and it is a circumſtance well known, that many of the fair ſex, when they have loſt the power of wounding, devote themſelves much to the healing and curing art, and to the preparation and diſpenſing of medicines. Dr. Mohſen ſays, that the firſt apothecaries in Germany came from Italy. This may be probable, but I know no proof of it.—I ſhall now proceed to give ſome account of the oldeſt mention made of apothecaries, which will ſerve to confirm what I have ſaid above.

Of Engliſh apothecaries I know nothing more than what Dr. Mohſen has already quoted from Anderſon *, who ſays, that king Edward III, in the year 1345, gave a penſion of ſixpence a day to Courſus de Gangeland, an apothecary in London, for taking care of and attending his majeſty during his illneſs in Scotland; and this is the firſt mention of an apothecary in the Fœdera.

Of apothecaries in France no mention occurs before the year 1484; when they received their ſtatutes in the month of Auguſt from Charles

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ſtill retain their ancient names, though applied to other purpoſes. In this manner the œconomical garden at Gottingen is called by the common people, the apothecary's garden.

* Geſchichte des Handels, ii. p. 365.

VIII *. They received others in 1514 under Louis XI; in 1516 and 1520 under Francis I; in 1571 under Charles IX; in 1583 under Henry III; and in 1594 under Henry IV. Theſe regulations were renewed and confirmed by Louis XIII, in the years 1611, 1624, and 1638 †.

For the moſt copious information reſpecting German apothecaries, we are indebted to Mr. Sattler. In the beginning of the fifteenth century an apothecary's ſhop was eſtabliſhed at Stutgard by a perſon named Glatz, which, as the only one in the country, was firſt ſanctioned by the count de Wirtemberg in 1458. In the patent given on that occaſion it was ſaid that Glatz's anceſtors had, for many years, kept an apothecary's ſhop at Stutgard, and had furniſhed it as a proper apothecary ought. In the year 1457, count Ulric gave to Mr. John Kettner, whom the year before he had appointed to be his domeſtic phyſician, leave alſo to eſtabliſh an apothecary's ſhop at Stutgard, and promiſed to allow no other in his dominions. The apothecary received yearly from the count a certain quantity of wine, barley and rye; but, on the other hand, he engaged to ſupply the court with as much confectionary

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[*] Hiſtoire de Paris, par Sauval, ii. p. 474. Hiſtoire de Paris, par Felibien, ii. p. 927. Traité de la police, par De la Mare, i. p. 618.

[†] Dictionnaire des arts et metiers, par Joubert, i. p. 105.

fectionary as might be neceſſary, at the rate of twelve ſhillings per pound*. Both theſe ſhops ſeem afterwards to have been abandoned, and the count and the apothecary to have entertained the ſame opinion, that each could renounce his contract when he pleaſed. In the year 1468 one Albrecht Mulſteiner, or Altumſteiner, from Nuremberg, was appointed apothecary, with a promiſe that no other private or public ſhop ſhould be tolerated except that at Wirtemberg. The patent is almoſt like that given to Kettner; but it deſerves to be remarked that it contains, in an additional clauſe, a catalogue of all the different articles, with their prices. An apothecary's ſhop is mentioned at Tubingen, under count Everhard, as an hereditary fief, the poſſeſſor of which bound himſelf to ſerve as phyſician and apothecary to the army in time of war. In the year 1500 duke Ulric of Wirtemberg allowed one Syriax Horn to eſtabliſh an apothecary's ſhop at Stutgard, and appointed him his apothecary for ſix years. He was obliged to ſwear that he would ſupply government and all public officers, as well as the duke's ſubjects, with medicines; and the body phyſician was enjoined to viſit the ſhop once every year, in order to examine whether Horn conducted himſelf according to the regulations laid down for him, and ſold his medicines at the fixed prices *. In 1559 four apothecaries were appointed in the duchy, viz. at Stutgard, Goppingen, Kalw and Bintigheim, which are ſtill called the land-apothecaries. At the ſame period there was an apothecary's ſhop in the ducal palace at Stutgard, which the conſort of duke Chriſtopher cauſed to be furniſhed at her own expence: and from which the poor received gratis whatever medicines they ſtood in need of †.

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* Damit wir und die unſern und auch fuſt menglich, der die bruchen wirdet, verſehen ſy und die materyen und ſpetzyen, was das iſt, das ein appentecker haben ſoll, das ſoll er geben als zymlich und gewonlich iſt in andern appentecken am nechſten umb unſer land gelegen - - - Er ſoll uns auch gut gemein confect geben ſo vil wir bedorfen und zu im niemen werden, und ſollen wir im geben fur ein pfundt ſollich confect zwolf ſchilling heller. *Sattlers Geſchichte des herzogthums Würtenberg unter den Grafen*, vol. v. p. 159. Addenda, p. 329.

That there were apothecaries' ſhops at Augſburg ſo early as the thirteenth and fourteenth centuries, according to the conjecture of Mr. von Stetten, has been mentioned already. By the records of that city it appears that a public ſhop was kept there by a female apothecary in the year 1445; and at that period a ſalary was paid by the city to the perſon who followed that occupation. In 1507 an order was paſſed that the apothecaries' ſhops ſhould be from time to time inſpected; and in

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* Sattlers Geſchichte Würtenbergs unter den herzogen, i. p. 59.

† Weiſſers Nachrichten von den geſetzen des herzogthums Wirtemberg. Stutgard 1781, 8vo. p. 137.

1512 a price was ſet upon their medicines, and all others were forbidden to deal in them *.

The antiquity of the firſt apothecary's ſhop at Hamburgh, which belonged to the council, cannot be determined ; but it is with certainty known that one exiſted there before the ſixteenth century. It was ſituated in the middle of the city, near the council-houſe and the exchange, and had a garden belonging to it, in the new town. Before the year 1618 there was at Hamburgh alſo a private apothecary's ſhop †. In 1529 a city phyſician was appointed, and quacks and mountebanks were then baniſhed. The annual viſitation by the city phyſician was eſtabliſhed in 1557. The oldeſt regulation reſpecting apothecaries is of the year 1586 ‡.

Apothecaries' ſhops, legally eſtabliſhed, exiſted without doubt at Franckfort on the Mayne before the year 1472 ; for at that period the magiſtrates of Conſtance requeſted to know what regulations were made there reſpecting the prices of medicines. In 1489 the city phyſician was inſtructed to inſpect them carefully, and to ſee that the proper prices were affixed to the different articles. In 1500 all the apothecaries were obliged to take an

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* Von Stetten, p. 242.

† Sammlung der Hamburgiſchen geſetze und verfaſſungen. Hamburg 1773, 8vo. xii. p. 28.

‡ Nucleus receſſuum Hamburgenſ.

oath that they would obſerve the regulations preſcribed for them; and in 1603 a decree was paſſed that no more apothecaries' ſhops ſhould be allowed for twelve years than the four then exiſting; and yet we are told that the fourth was firſt built in 1629 *.

In the police regulations drawn up at Baſle in the year 1440, by which it was ordered that a public phyſician ſhould be conſtituted in every German imperial city, with the allowance of an eccleſiaſtical benefice or canonry, in order that he might exerciſe his art gratis, it is ſaid: "What coſtly "things people may wiſh to have from the apo-"thecary's ſhop they muſt pay for †." Dr. Mohſen hence concludes that common roots and herbs were not then ſold in the apothecaries' ſhops, but expenſive compounds brought from other countries.

The firſt apothecary's ſhop at Berlin, of which any certain and authentic account can be found in the king's feudal records, was eſtabliſhed in 1488. At that period the magiſtrates gave one Hans Zehender a right to the hereditary poſſeſſion of a ſhop, and promiſed to allow him yearly, to enable him

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* Von Lerſner's Frankfurter Chronik, i. p. 26, 493, and ii. p. 57, 58.

† Goldaſti Conſtitutiones Imperiales. Francof. 1607. fol. p. 192.

to ſupport it, a certain quantity of rye, with a free houſe, and engaged alſo to exempt him from all contributions, watching and other public burdens, and to permit no other apothecary to reſide in the city. This agreement was confirmed in 1491 by the elector John; and in 1499 the elector Joachim I, on his coming to the government, gave the apothecary a new patent, in which his body phyſician was charged to take care that the ſhop ſhould be furniſhed with proper drugs, that the medicines for the elector and his court ſhould be made up according to the preſcriptions; and that they ſhould not be charged too high, contrary to the regulated prices *. In the year 1573 there was an apothecary's ſhop in the palace for the uſe of the court; but Mr. Nicolai † conjectures that it was only a portable one, and conſiſted of ſome cheſts filled with medicines. The preſent one was founded in 1598 by Catherine conſort of the elector Joachim Frederick ‡; but the eſtabliſhment, as it now ſtands, began to be formed in the year 1605, when Criſpin Haubenſchmid, the firſt apothecary to the court, was brought from Halle to Berlin. Catherine, widow of the margrave John of Cuſtrin, cauſed an apothecary's ſhop for the uſe

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* Mohſens Geſchichte, p. 379, where may be found a copy of the letter-patent of 1491; and p. 530, where the later hiſtory of the Berlin apothecaries is given.

† Beſchreibung von Berlin. Third edition, i. p. 39 and 87.

‡ Hallens Werkſtate der künſte, v. p. 399.

of the court to be eſtabliſhed at Kroſſen, under the inſpection of her phyſician Wigands, becauſe there was then no ſhop of that kind in the place; and at her death in 1574 ſhe bequeathed it to the magiſtrates *.

In Halle there was no apothecary's ſhop till the year 1493. Before that period medicines were ſold only by grocers and barbers. In the above year however the council, with the approbation of the archbiſhop, permitted one Simon Puſter to eſtabliſh an apothecary's ſhop, in order, as ſtated in the patent, that the citizens might be ſupplied with confections, cooling liquors, and ſuch like common things, at a cheap rate; and that, in caſes of ſickneſs, they might be able to procure readily freſh and well-prepared medicines. Puſter was exempted by it from all taxes and contributions for ten years, but with this proviſo, that during that period he ſhould furniſh yearly, at the council-houſe, for two collations in the time of the feſtivals, eight pounds of good ſugar confections, fit and proper to be uſed at ſuch entertainments. It ſtated, on the other hand, that in future no kind of preſerves made with ſugar, or what was called confectionary, or theriac, ſhould be kept for ſale or ſold either in the market or in booths, ſhops or ſtalls, except at the annual fair. This apotheca-

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* Mohſen, p. 555.

ry's ſhop was the only one in Halle till the year 1535, when the archbiſhop gave his phyſician, J. N. von Wyhe, liberty to eſtabliſh a new one; but with an aſſurance that, to eternity, no more apothecaries' ſhops ſhould be permitted in Halle; and this declaration was confirmed by the chapter. Notwithſtanding the archbiſhop's promiſe, ſtrengthened by that of his clergy, one Wolf Holzwirth, a ſkilful apothecary, who returned from Italy, found means to procure permiſſion in 1555 to eſtabliſh a third apothecary's ſhop *.

In the year 1409, when the univerſity of Prague was transferred to Leipſic, and every thing at the latter was put on the ſame footing as at the former, an apothecary's ſhop was alſo eſtabliſhed, which, as that at Prague had been, was known by the ſign of the Golden Lion.

In the year 1560 there was no apothecary's ſhop at Eiſenach, and even in the time of duke John Erneſt, who died in 1638, there was none for the court; but the place of apothecary was ſupplied by one of the yeomen of the jewellery †.

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* Von Dreyhaupts Beſchreibung des Saal-Creyſes, ii. p. 561.

† I cannot remember where I obtained this information. I imagined that I had read it in *Schumachers Nachrichten zur erläuterung der Sächſiſchen und Eiſenachen geſchichte*, 1776; but on turning over that work I was not able to find it.

In the year 1598, count John von Oldenburg cauſed an apothecary's ſhop to be eſtabliſhed at Oldenburg for the common good of the country *.

In Hanover the firſt apothecary's ſhop was eſtabliſhed by the council in 1565, near the council-houſe †. The conſort of duke Philip II of Grubenhagen, a princeſs of Brunſwick, who was married in 1560, ſupported at her court an apothecary's ſhop and a ſtill-houſe for the benefit of her ſervants and the poor ‡. Duke Julius, who came to the government of Brunſwick in 1568, cauſed apothecaries' ſhops to be eſtabliſhed in his territories; and his conſort, a daughter of the elector of Brandenburg, kept, for the uſe of the poor, an expenſive apothecary's ſhop in her palace; and the citizens of the new Heinrichſtadt, near Wolfenbuttel, were allowed, when afflicted by any epidemi-

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* Hamelmanns Oldenburgiſche Chronik, 1599, fol. p. 491.

† Grupens Origines Hannoverenſes. Gottingen 1740, 4to. p. 341.

‡ "By her apothecary's ſhop and ſtill-houſe one may diſcover what real compaſſion the chriſtian-like electreſs ſhewed towards the poor who were ſick or infirm; for, by having medicines prepared, and by cauſing all kinds of waters to be diſtilled, ſhe did not mean to aſſiſt only her own people and thoſe belonging to her court, but the poor in general, whether natives or foreigners, and not for the ſake of advantage or gain, but gratis and for the love of God." *Letzners Daſſelſche und Eimbeckſche chronica.* Erfurt 1596, fol. p. 104.

cal diſeaſe, the dyſentery, quinſy, ſcurvy or ſtone, to be ſupplied with medicines from it free of all expence *.

The apothecary's ſhop at the court of Dreſden was founded by the electreſs Ann, a Daniſh princeſs, in the year 1581. In 1609 it was renewed by Hedwig, widow of the elector Chriſtian I; and in 178 it received conſiderable improvement †.

Guſtavus Erickſon, king of Sweden, was the firſt perſon in that country who attempted to eſtabliſh an apothecary's ſhop. On the 20th of March 1547, he requeſted Dr. John Audelius of Lubec to ſend him an experienced phyſician and a good apothecary. On the 5th of May, 1550, his body-phyſician, Henry von Dieſt, received orders to

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* This account is taken from the learned information collected by profeſſor Spittler, in his *Geſchichte der fürſtenthums Hannover*. Gottingen 1786, 8vo. p. 275. That the council of the city of Gottingen began very early to pay great attention to medical inſtitutions, is proved by the following paſſage from the *Gottingiſchen Chronike* of Franciſcus Lubecus: "Anno 1380, the city procured a ſurgeon from Eſchwege, who "with his ſervant were to be exempted from contributions and "watching; and who were to receive clothes yearly from "the council." See *Beſchreibung der ſtadt Gottingen*. Gotting. 1734, 4to. i. p. 100.

† (Anton. Weckens) Beſchreibung und vorſtellung der reſidenz Dreſden, 1680. fol. p. 69. Weinarts Topographiſche geſchichte der ſtadt Dreſden. Dreſden 1777, 4to. p. 304.

bring a ſkilful apothecary into the kingdom. When the king died in 1560, he had no other phyſicians with him than his barber maſter Jacob, an apothecary maſter Lucas, and his confeſſor Magiſter Johannes, who, according to the popiſh mode, practiſed phyſic, and preſcribed for his majeſty. Maſter Lucas, as appears, was the firſt apothecary at Stockholm. On the 21ſt of March 1575, one Anthony Buſenius was appointed by king John apothecary to the court *; and in 1623 Philip Magnus Schmidt, a native of Langenſalza in Thuringia, was choſen to fill that office. In the year 1675 there were five apothecaries' ſhops in Stockholm: ſince 1694 the number has been nine. The firſt apothecary's ſhop at Upſal was eſtabliſhed in 1648 by Simon Wolimhaus, who came from Konigſee in Thuringia, and from whom the preſent family of count Gyllenborg are deſcended. The firſt apothecary's ſhop at Gottenburg was eſtabliſhed about the ſame time †. Towards the end of the ſixteenth

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* Von Dalins Geſchichte des reiches Schweden, überſetzt von Dahnert. Roſtock und Greifswald 1756—1763, 4 vol. 4to. iii. p. 318 and 394.

† This information may be found in *Inträdes-tal om Stockholm för 200 ar ſen, och Stockholm nu förtiden, i anſeende til handel och vetenſcaper, ſärdeles den medicinſka, hallit* 1758 af Pet. Jon. Bergius, 8vo. This diſcourſe contains ſo valuable an account of the hiſtory of medicine in Sweden, and the hiſtory of literature in general, that a good tranſlation of it would deſerve thanks.

ſixteenth century phyſicians and apothecaries were invited into Ruſſia by the czar Boris Godunow *.

I ſhall here take occaſion to remark the following circumſtance: At the Byzantine court the keeper of the wardrobe, as the yeoman of the jewellery at Eiſenach in the ſixteenth century, had the care of the portable apothecary's ſhop when the emperor took the field. It was called *pandectæ*, and contained theriac and antidotes, with all kinds of oils, plaſters, ſalves and herbs proper for curing men and cattle †.

I muſt add a few obſervations alſo reſpecting the earlieſt *Diſpenſatorium*. It is almoſt generally admitted that the firſt was drawn up by Valerius

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* Eſſai ſur la bibliotheque à St. Peterſbourg, par J. Backmeiſter, 1776, 8vo. p. 37.

† Conſtantinus Porphyrogen. de ceremoniis aulæ Byzantinæ. Lipſiæ 1751, fol. i. p. 270. The βασιλικον βεστιαριον ought to contain θηριακην, ἡνιτζιν, ἕτερα αντιφαρμακα σκευαστα και μονοειδη, δια τους φαρμακευομενους· πανδεκτα μετα παντοιων ελαιων και βοηθηματων, και παντοιων εμπλαστρων και αλοιφων και αλημματων και λοιπων ιατρικων ειδων, βοτανων και λοιπων των εις θεραπειαν ανθρωπων και κτηνων τυγχανοντων. Fert quoque veſtiarium theriacam, enitzin, aliaque antipharmaca compoſita et ſimplicia, pro iis qui forte venenum hauſerint: pandectas porro (ſeu apothecas univerſales) refertas omnis generis oleis et remediis et emplaſtris, et illitibus et unguentis aliiſque ſpeciebus medicis, ut herbis et aliis, quæ ſanandis hominibus beſtiiſque conducunt.—What ηνιτζιν was I do not know. Reiſke has left it unexplained.

Cordus,

Cordus, or at leaſt that his was the firſt made known by the approbation of public magiſtrates. Haller has remarked one older; but it is now known only from the title mentioned by Maittaire*. Cordus however appears to have firſt uſed the word *diſpenſatorium* for a collection of receipts, containing directions how to prepare the medicines moſt in uſe. This book, it is well known, has been often printed with the additions of other phyſicians; but, in my opinion, Conring † is in a miſtake when he ſays that it was improved and enlarged by Matthiolus. I have in no edition found any additions of Matthiolus; and the error ſeems to have ariſen from the chriſtian name of Matthias Lobelius, which ſtands in the title of ſome editions, becauſe his annotations are added to them. It is very ſingular that Keſtner ‡ alſo has fallen into this miſtake, who, however, ſays that the name of Matthiolus is only in the title, for in the book itſelf he found no appearance of his having had any concern with it.

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* Bibliotheca botan. i. p. 244. Ricettario di dottori dell' arte e di medicina del collegio Fiorentino, all' inſtantia delli ſignori conſoli della univerſità delli ſpeciali. Firenz. 1498, fol. Maittaire. Primum, quantum repperi, diſpenſarium.

† Conringii Introductio in artem medicam. Helmſtadii 1687. 4to. p. 375: Idem deinde etiam emendaverunt atque auxerunt Matthiolus et Lobelius.

‡ C. G. Keſtneri Bibliotheca medica, Jenæ 1746, 8vo. p. 638: Matthioli vero annotationes in rubro quidem promittuntur, nihil vero earum in nigro invenitur. In profeſſor Böhmers *Handbuch der naturgeſchichte* Matthioli et Lobelii ſcholia et emendationes occur, i. 2. p. 304.

QUARANTINE.

OF all the means by which in latter times the infection of that dangerous malady, the plague, has been ſo much guarded againſt, that according to general opinion, unleſs the Deity render all precaution uſeleſs, it can never again become common in Europe, the moſt excellent and the moſt effectual is, without doubt, the eſtabliſhment of quarantine. Had not hiſtory been more employed in tranſmitting to poſterity the crimes of princes, and particularly the greateſt of them, deſtructive wars, than in recording the introduction of ſuch inſtitutions as contribute to the convenience, peace, health and happineſs of mankind, the origin of this beneficial regulation would be leſs obſcure than it is at preſent. At any rate, I have never yet been ſo fortunate as to obtain a ſatisfactory account of it; but though I am well aware that I am neither acquainted with all the ſources from which it is to be drawn, nor have examined all thoſe which are known to me, I will venture to lay before my readers what information I have been able to collect on the ſubject, aſſuring them at the ſame time, that it will afford me great pleaſure if my attempt ſhould induce others fond of hiſtorical reſearch to enlarge it.

The opinion that the plague was brought to Europe from the Eaſt, is, as far as I am able to judge, ſo fully confirmed, that it cannot be any longer doubted; though it is certainly true, that every nation endeavours to trace the origin of infectious diſorders to other people. The Turks think that the plague came to them from Egypt; the inhabitants of that country imagine that they received it from Ethiopia; and, were not our geography deficient reſpecting the latter, we ſhould perhaps know that the Ethiopians do not believe that this dreadful ſcourge originated among them *. As the plague however has always been conveyed to us from the Eaſt, and has firſt, and moſt frequently, broken out in thoſe parts of Europe which approach neareſt to the Levant, both in their phyſical

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* The oldeſt plague of which we find any account in hiſtory, that ſo fully deſcribed by Thucydides, book ii. was expreſsly ſaid to have come from Egypt. Evagrius in his *Hiſtor. eccleſiaſt.* iv. 29, and Procopius *de Bello Perſico*, ii. 22, affirm alſo that the dreadful plague in the time of the emperor Juſtinian was likewiſe brought from Egypt. It is worthy of remark, that on both theſe occaſions, the plague was traced even ſtill farther than Egypt; for Thucydides and the writers above quoted ſay that the infection firſt broke out in Ethiopia, and ſpread thence into Egypt and other countries. See Mr. Dohms appendix to *Ives Reiſen nach Indien und Perſien.* Leipſic 1775, 8vo. ii. p. 462.

ſical and political ſituation, thoſe I mean which border on Turkey, and carry on with it the moſt extenſive trade, we may with the more probability conjecture that theſe countries firſt eſtabliſhed quarantine, the moſt powerful means of preventing that evil. If we ſearch farther into this idea, we ſhall be inclined to aſcribe that ſervice to the Venetians, as being the people, who, when the plague began to be leſs common, not only carried on the greateſt trade in the Levant, but had the misfortune to become always nearer neighbours to the victorious Turks. It is alſo probable, that the Hungarians and Tranſylvanians ſoon followed their example in this approved precaution, as the Turks continued to approach them; and this agrees perfectly with every thing I have read in hiſtory.

Brownrigg, an Engliſhman, who wrote a book on the means of preventing the plague *, ſays, that quarantine was firſt eſtabliſhed by the Venetians in the year 1484. As I have not had an opportunity of ſeeing that work, I do not know by what authorities the author ſupports his aſſertion. Perhaps he has no other voucher than his learned countryman Mead, who aſſigns the ſame year,

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* Conſiderations on the means of preventing the communication of peſtilential contagion, by William Brownrigg. London 1771. See *Gottingiſche gelehrte anzeigen* 1772, p. 22.

without adducing any proofs *. I imagined that I ſhould find ſome more certain information reſpecting this point in Le Bret's Hiſtory of the Republic of Venice: but as that hiſtorian does not mention, as the title profeſſes, the original ſources from which he derived his materials, his work is leſs worthy of credit. He tells us however that the grand council, in 1348, choſe three prudent perſons, whom they ordered to inveſtigate the beſt means for preſerving health, and to lay the reſult of their enquiry before the council †. The plague which broke out afterwards in 1478, rendered it neceſſary that ſome permanent means ſhould be thought of, and on that account a peculiar magiſtracy conſiſting of three noblemen, with the title of *ſopra la ſanità*, was inſtituted in 1485. As theſe were not able to ſtop the progreſs of the diſeaſe, the painful office was impoſed upon them, in 1504, of impriſoning people againſt whom complaints might be lodged, and even of putting them to death; and in 1585 it was declared, that from the determination of theſe judges there ſhould be no appeal. Their principal buſineſs was the inſpection of the lazarettos erected in certain places at ſome diſtance from the city, and in which it was required that all perſons and merchandize coming from ſuſpected parts ſhould continue a ſtated time fixed by the laws. The captain of every ſhip was obliged alſo to ſhew there the bill of health which he had brought along with him.

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* *De Peſte*, in Mead's *Opera Medica*. Gottingæ 1748, ii. p. 40: Venetiis cuſtodiæ imponi ſolitæ ſunt inde ab anno 1484, quo primum tempore, ut ex hiſtoriarum monumentis colligere eſt, in Europa hæc conſuetudo cœpit.

† Geſchichte von Venedig. Riga 1775, 4to. part ii. diviſ. 2. p. 752.

As Le Bret produces no proof that quarantine was eſtabliſhed by the Venetians ſo early as he ſays, I cannot help ſuſpecting that he is miſtaken reſpecting the year (1348), and conjecture that it ought to be 1448, or perhaps 1484. I have not been able however to reſolve my doubt; for, in examining different Italian writers, I find that various years are given *. The inſtitution of the council of health (*ſopra la ſanità*) is mentioned by Bembo; but I cannot diſcover from him to what year he alludes †. His countryman Lancellotti, who undoubtedly muſt have underſtood him well, makes it to be 1491 *. Caſpar Cantarenus, who died in 1542, in the ſixtieth year of his age, mentions no particular period, but ſays that inſtitution was formed not long before his time †. The iſlands on which the peſt-houſes were erected, were called *il Lazaretto vecchio*, and *il Lazaretto nuovo*. In the elegant deſcription of Venice, ornamented with abundance of plates, below mentioned, it is remarked that the peſt-houſe on the former iſland was built in 1423, and that on the latter in 1468 ‡. The ſame account is given in the neweſt and beſt Topography of Venice ||. I can add nothing farther on this ſubject except

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* Every thing ſaid by Le Bret on this ſubject may be found equally full in *Saggio ſulla ſtoria civile, politica, eccleſiaſtica, e ſulla corografia e topografia degli ſtati della republica di Venezia*; dell' abate D. Chriſtoforo Tentori. In Venezia 1786, 8vo. tomo vi. p. 391. As Vettore Sandi in *Principi di ſtoria civile della republica di Venezia*, publiſhed from 1755 to 1769, in nine quarto volumes, gives the ſame account, lib. viii. cap. 8. art. 4, they muſt have both got their information from the ſame ſource.

† Il ſeguente anno, percioche nella città il morbo havea comminciato a farſi ſentire, creò la Republica un magiſtrato di tre ſignori ſopra la ſanità; il qual magiſtrato ſempre dapoi continuò a crearſi

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a crearſi di tempo in tempo. *Della hiſtoria Viniliana, di M. Pietro Bembo, card. volgarmente ſcritta, libri* xii. In Vinegia 1552, 4to. lib. i. p. 10. A Latin tranſlation of this hiſtory may be found in *Theſaurus antiquitatum et hiſtor. Italiæ*, v. 1. p. 15.

* L'Hoggidi, overo il mondo non peggiore, ne più calamitoſo del paſſato. In Venetia 1627, 8vo. p. 610.

† Hoc præfectorum genus non multo ante noſtram tempeſtatem inſtitutum fuit; cum quidem antea creberrime urbs peſtilentia laboraret. - - - - - Sed poſtquam novo huic magiſtratui hæc cura demandata eſt, nulla pene peſtilentia fuit. *De Republica Venetorum*, lib. iv, in *Theſaurus antiquitat. Italiæ*, v. 1, p. 50.

‡ Theſaurus antiquitatum Italiæ, v. 2, p. 241.

|| Il Lazaretto vecchio, iſola, l'anno 1422 fu dal Senato giudicata opportuna ad accogliere le perſone e le merci che venivano da' paeſi marittimi, onde colà reſtaſſera finchè foſſero giudicate

except what is ſaid by Brownrigg, who affirms that letters of health, in which he confides more than in quarantine, were firſt written in 1665 by the conſuls of the different commercial nations *. Why the ſpace of forty days was choſen as a proof I do not know. It appears however, that this period was not fixed from medical obſervations, as has already been remarked by Chenot †. As proper

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dicate non infette di peſte, o d'altro mal contagioſo. - - - - Furono in queſt' iſola eretti de' publici alberghi a queſto fine, ed allora ſi chiamò queſt' iſola col nome di Lazzaretto. E'poco diſcoſta dall'iſola di S. Lazzaro, dalla quale ne' giorni feſtivi paſſa un di que' monaci a celebrare la meſſa nella chieſa che vi fu decentamente ſabbricata. Queſti alberghi fúrono in più ampia forma riſtaurati nel 1565. Chiamaſi poi Lazzaretto vecchio, perchè nel 1467 ne fu eretto un altro, che fu chiamato Nuovo, in una altra iſola; onde non mancaſſe mai albergo a chi veniva dal mare con ſoſpetto di contagioſa malattia. *Topografia Veneta, overo Deſcrizione dello ſtato Veneto.* Venezia 1786, 8vo. iv. p. 263. In Buſching's Geography both theſe iſlands are omitted, but they are noticed in Hubner's Geography, Dreſden and Leipſic 1761, i. p. 761. In the latter, however, for the year 1648, which is an egregious error, muſt be ſubſtituted 1468. I have in my poſſeſſion an old map of the Venetian States, which I can no otherways deſcribe than by ſaying, that in the middle of it ſtands the name *Bertelli.* In this map both the iſlands are delineated.

* Gottingiſche gelehrte anzeigen 1782, p. 22.

† Utut vero hoc inſtitutum inſigni ſane ſeſe diſtinxerit emolumento, eique integræ provinciæ et regna ſuam a peſte immunitatem ſæpe acceptam retulerint et adhuc dum referant, frequens tamen meditatio mihi rationem nondum ſuggeſſit, cur exantlanda in lazaretis mora numero quadraginta dierum adſtricta fuerit. Sive

proper experiments had not been made to aſcertain how long the infection might lie dormant, it was perhaps choſen merely from ſome ſuperſtitious notions, becauſe people were accuſtomed to it in Lent.

PAPER-HANGINGS.

THREE kinds of paper-hangings have for ſome time paſt been much uſed on account of their beautiful appearance and their moderate price. The firſt and plaineſt is that which has on it figures printed or drawn either with one or more colours, and which conſiſts only of painted paper. The ſecond ſort contains figures covered with ſome woolly ſtuff paſted over them: and the third, inſtead of woolly ſtuff, is ornamented with a ſubſtance that has the glittering brightneſs of gold and ſilver. It appears that the idea of covering walls with parti-coloured paper might have readily occurred, but

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Sive enim peſtis decurſum, ſive miaſmatis indolem conſidero, nihil invenio quod ſatisfaciat. An forte obſervationes legi cauſam dederunt? Aſſerere aut negare non poſſum, qui paucos auctores de peſte legi. Interim ſequentes potius innuunt miaſma peſtiferum, quando ex uno loco in alium tranſportatur, intra multo breviorem moram in actum deduci. - - - Circa nullum morbum veræ fidæque obſervationes magis deſunt, quam circa peſtem. *Tractatus de Peſte*. Vindobonæ 1766, 8vo. p. 196.

but the fear of ſuch hangings being liable to ſpeedy decay may have prevented the experiment from being made. In my opinion the ſimpleſt kind was invented after the more ingenious, that is to ſay, when the woolly or velvet kind was already in uſe *. The preparation of them has a great affinity to the printing of cotton. Wooden blocks of the like kind are employed for both; plates of copper are alſo uſed; and ſometimes they are painted after patterns. Artiſts poſſeſs the talent of giving them ſuch a reſemblance to ſtriped and flowered ſilks and cottons, that one is apt to be deceived by them on the firſt view. Among the moſt elegant hangings of this kind, may be reckoned thoſe which imitate ſo exactly every variety of marble, porphyry, and other ſpecies of ſtones, that when the walls of an apartment are neatly covered with them, the beſt connoiſſeur may not without cloſe examination be able to diſcover the deception. That the reſemblance may be ſtill greater,

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* The ſimpleſt or worſt articles are not always the oldeſt or the firſt. The deterioration of a commodity is often the continuation of an invention, which, when once begun, is by induſtry carried backwards and forwards, in order that new gain may be acquired from each variation. The earlieſt printers, for example, had not the art of printing with ſo ſlight ink and on ſo bad paper as ours employ. And Aldus, perhaps, were he now alive, would wonder as much at the cheap mode of printing ſome of our moſt uſeful books, ſuch as Buſching's Geography, as he would at a Baſkerville's Horace.

er, a hall may be divided by an architect into different compartments by pillars, ſo as to have the appearance of a grand piece of regular architecture. Whether Mr. Breitkopf at Leipſic was the inventor of this kind of hangings, I do not know, but it is certain that he has brought it to great perfection *.

The ſecond kind, or, as it is called, velvet-paper, is firſt printed like the former, but the figures are afterwards wholly, or in part, covered with a kind of glue, over which is ſtrewed ſome woolly ſubſtance, reduced almoſt to duſt, ſo that by theſe means they acquire the appearance of velvet or pluſh. The ground and the reſt of the figures are left plain; but the whole proceſs is ſo complex that it is impoſſible to convey a proper idea of it by a ſhort deſcription. The ſhearings of fine white cloth, which the artiſt procures from a cloth-manufactory, and dyes to ſuit his work, are employed for this purpoſe. If they are not fine enough, he renders them more delicate by making them paſs through a cloſe hair ſieve †. This, as well as the third kind,

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* See my Beytrage zur ökonomie, technologie, &c. vol. iii. p. 470.

† A full and technical deſcription of the method of manufacturing theſe paper-hangings may be found in *Hartwig's Handwerke und Künſte*, xv. p. 5; *Jacobſon's Schauplatz der zeugmanufacturen*,

kind, was formerly made oftener than at preſent upon canvaſs; and, in my opinion, the earlieſt attempts towards this art were tried not upon paper but on linen cloth. The paper procured at firſt for theſe experiments was probably too weak; and it was not till a later period that means were found out to ſtrengthen it, and ſtiffen it by ſize and paſte.

The invention of velvet-paper is, by ſeveral French writers *, aſcribed to the Engliſh; and, if they are not miſtaken, it was firſt made known in the reign of Charles I. On the 1ſt of May 1634, an artiſt, named Jerome Lanyer, received a patent for this art, in which it is ſaid that he had found out a method of affixing wool, ſilk, and other materials of various colours upon linen cloth, ſilk, cotton, leather, and different ſubſtances with oil, ſize, and cements, ſo that they could be employed for hangings as well as for other purpoſes †. The

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nufacturen, i. p. 296, and in the *Encyclopédie*, xv p. 898, firſt edition, from which it has been copied into *Savary's Dictionnaire de commerce.* The French names for theſe hangings are *papiers veloutés*, or *papiers ſoufflés*; *tapiſſerie en laine hachée*; *tapiſſerie de tonture de laine.*

* Origny, in Dictionnaire des origines, v. p. 332. Journal œconomique, 1755, Mars, p. 86. Savary, Dictionnaire de commerce, iv. p. 903.

† I ſhall here inſert the words of the patent: "To all thoſe to whom theſe preſents ſhall come, greeting. Whereas our

inventor wiſhed to give to this new article the name of Londrindiana, which appears however not to have continued in uſe. It is worthy of remark, that this artiſt firſt made attempts to affix ſilk upon ſome ground, but that method as far as I know was not brought to perfection; that he employed ſor the ground linen and cotton cloth, or leather;

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truſty and well-beloved ſubject and ſervant Jerome Lanyer hath informed us, that he by his endeavours hath found out an art and myſtery by affixing of wool, ſilk, and other materials of divers colours upon linen cloth, ſilk, cotton, leather, and other ſubſtances, with oil, ſize, and other cements, to make them uſeful and ſerviceable for hangings and other occaſions, which he calleth Londrindiana, and that the ſaid art is of his own invention, not formely uſed by any other within this realm, &c." - - -*Fœdera*, tom. xix. London 1732, fol. p. 554. In the German tranſlation of *Anderſon's Hiſtory of Commerce*, v. p. 137, the word *ſize* is tranſlated *wax*, probably becauſe the dictionaries tranſlate to *ſize* by the expreſſions *to wax*, to *cover over with wax*. But ſize among gilders and thoſe employed in lackering is the ground upon which they lay gold and ſilver leaf, in order that it may adhere.—The following obſervations may ſerve to illuſtrate all works of this nature in general. Painting, according to the moſt common technical meaning, may be divided into three kinds. In the firſt the colours or pigments are mixed with a viſcous or glutinous fluid to bind them, and make them adhere to the body which is to be painted. Gums, glue, varniſh, &c. may be uſed for this purpoſe. Vegetable colours will not admit of ſuch additions, becauſe they contain gum in their natural compoſition. Another kind conſiſts in previouſly waſhing over the parts that are to be painted with ſome viſcous ſubſtance, and then laying on the colours as the figures may require. Size, or cement (I uſe the word in the moſt extenſive ſenſe) is of ſuch a nature leather; and that no mention is made of his having uſed paper, though he ſeems not to have confined himſelf entirely to leather or cloth.

Tierce, a Frenchman, has however diſputed this invention with the Engliſh; for he aſſerts that one of his countrymen at Rouen, named François, made ſuch kinds of printed paper-hangings ſo early as the year 1620, and 1630, and ſupports his

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nature that either in drying or glazing it becomes hard, and binds the colours. To this method belongs not only gilding, imitating bronze, and making velvet-paper-hangings, but alſo painting on glaſs and in enamel. By the third method, the colours are applied to the ground without any binding ſubſtance: they are therefore more liable to decay, as is the caſe in painting with crayons; but they will however adhere better when the pigments conſiſt of very fine particles like ceruſe, or black-lead. It would be a great acquiſition if a ſubſtance could be found out to bind the colours uſed in this art without injuring them, or to fix the crayons. The third kind of painting is not with colours, but with different bodies ready coloured, which are joined together in pieces according to a copy, either by cement or plaſter, as in moſaic, or by working them into each other, as in weaving and ſewing, which is painting with the needle. - - - - Are not the works of art almoſt like thoſe of nature, each connected together as a chain? Do not the boundaries of one art approach thoſe of another? Do they not even touch each other? Thoſe who do not perceive this approximation are like people unacquainted with botany, who cannot remark the natural order of plants. But if a connoiſſeur obſerve a gap in the chain of artificial works, we are to ſuppoſe that ſome links are ſtill wanting, the diſcovery of which may become a merit to more ingenious ages.

aſſertion by the patterns and wooden blocks which are ſtill preſerved, with the above-mentioned years inſcribed on them *. He is alſo of opinion, that ſome Frenchmen, who fled to England, when perſecuted for their religion, carried this art along with them. The inventor's ſon followed this buſineſs to a great extent for more than fifty years at Rouen, and died in 1748. Some of his workmen went privately to the Netherlands and Germany, where they ſold their art; and the French, therefore, with great confidence maintain, without knowing our artiſts and their works, that foreigners in this branch of manufacture are ſtill far behind them. In moſt works of the kind, my countrymen indeed are only imitators, not through want of talents to invent or to improve, but becauſe our great people, for whom they muſt labour, conſider nothing as faſhionable or beautiful, except what has been firſt made by the French or the Engliſh.

I ſhall here obſerve, that Nemeitz aſcribes the invention of wax-cloth-hangings, with wool chopped and beat very fine (theſe are his own words), to a Frenchman named Audran, who in the beginning of this century was an excellent painter in arabeſque and groteſque figures, and inſpector of the palace of Luxemburg at Paris, in which he

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* Journal œconomique, 1756, Fevrier, p. 92.

had a manufactory for hangings of that kind *. What particular ſervice he rendered to the art of making paper-hangings, I have not however been able to learn. Equally uncertain and defective is the information of Mr. von Heinecken †, that one Eccard invented the art of imprinting on paper-hangings gold and ſilver figures, and carried on a manufactory for ſuch works.

Of the time when theſe hangings began firſt to be made in Germany, I can only ſay, that the oldeſt information I know reſpecting them is to be found in a work ‡ by Andrew Glorez von Mahren, printed for the firſt time in 1670. It ſhews that the art was then very imperfect as well as little known, and that it was practiſed only by women upon linen for making various ſmall articles ||.

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[*] Both his brothers, John and Benedict Audran, were celebrated engravers. See *Nemeitz, Sejour de Paris*, Francfort 1728, 8vo. p. 314 and 306.

[†] Nachrichten von künſtlern und kunſtſachen. Leipzig 1768, 8vo. ii. p. 56. The author, giving an account of his travels through the Netherlands, ſays, “ Before I leave the Hague I muſt not omit to mention Mr. Eccard's particular invention for making paper-hangings. He prints ſome which appear as if worked through with gold and ſilver. They are fabricated with much taſte, and are not dear.

[‡] Haus-und land-bibliothek des Andreas Glorez von Mahren, iii. p. 90.

[||] The author ſays: I ſhall give an account of a beautiful art,

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One of the moſt ingenious new improvements in the art of manufacturing theſe hangings, conſiſts in beſtrewing them here and there with a glittering metallic duſt or ſand, by which they acquire a reſemblance to rich gold and ſilver brocade. From the above-quoted work it appears, that artiſts began very early to cover ſome parts of paper-hangings with ſilver droſs, or gold-foil; but as real gold was too dear to be uſed for that purpoſe, and as imitations of it ſoon decayed, this method ſeems

by which one may cover chairs, ſcreens, and other articles of the like kind, with a ſubſtance of various colours made of wool, cut or chopped very fine, and cleaned by being made to paſs through a hair ſieve - - - - - I remember that two Swabian women travelled about through ſome countries, and taught people this art, by which means they gained a good deal of money.—The edition of this work in the library of our univerſity has in the title page, *Regenſburg, zu Statt am Hof*, 1701; but there is beſides a printed ſlip of paper, paſted on, with the following words: *Nurnberg, zu finden bey Joh. Chriſt. Lochner.* No year is mentioned. The edition of Regenſburg, 1670, fol. is quoted by Munchauſen in his *Hauſvater*, ii. p. 10, 46. See Haller's *Biblioth. botan.* i. p. 551, and *Bœhmeri Bibliotheca ſcriptorum hiſt. nat.* i. 2. p. 610; where the name, however, is erroneouſly printed *Glorenze.* A larger volume was afterwards added with the title: *Continuation der Haus- und land-bibliothek*, in four parts. Nurnberg, fol. (properly Regenſburg, 1701). Of the author I have been able to procure no information. His book is a compilation ſelected without any taſte, and according to the ideas of the laſt century, from different writers, almoſt always without mentioning the ſources from which the articles are taken; but it deſerves a place in public libraries, becauſe it contains here and there ſome things which may help to illuſtrate the hiſtory of agriculture and the arts.

not long to have been continued. Inſtead of theſe, Nuremberg metallic duſt, as well as ſilver-coloured foil, are employed. Metallic duſt is the invention of an artiſt at Nuremberg, named John Hautſch, who conſtructed alſo a carriage which could be moved by the perſon who ſat in it. He was born in the year 1595, and died in 1670[*]. His deſcendants have continued to the preſent time the preparation of the metallic duſt, which is exported in large quantities from Nuremberg, and is uſed in ſhell-work, lackered-ware, and for various other purpoſes. It is prepared by ſifting the filings of different metals, waſhing them in a ſtrong lye, and then placing them on a plate of iron or copper over a ſtrong fire, where they are continually ſtirred till their colour is altered. Thoſe of tin acquire by this proceſs every ſhade of gold-colour, with a metallic luſtre; thoſe of copper the different ſhades of red and flame-colour; thoſe of iron and ſteel become of a blue or violet; and thoſe of tin and biſmuth appear of a white or blueiſh white colour. The duſt, tinged in this manner, is afterwards put through a flatting-mill, which conſiſts of two rollers of the hardeſt ſteel, like thoſe uſed by gold and ſilver wire-drawers, but for the greater convenience a funnel is placed over them[†]. I have in my poſſeſſion ſamples of all the above kinds, which have an exceedingly beautiful appearance. This metallic duſt is affixed ſo ſtrongly to paper, by means of a cement, that it is almoſt impoſſible to detach it without tearing the paper, as is the caſe with the paper-hangings procured from Achen. In French, ſuch paper is called *papiers avec paillettes.* The luſtre of it is ſo durable that it continues unaltered even on the walls of ſitting apartments. The metallic duſt however has a conſiderable weight, which may undoubtedly injure the paper.

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[*] Doppelmayr von Nürnbergiſchen Künſtlern, p. 301.

[†] Kunkels Glasmacher-Kunſt. Nurnberg, 1743, 4to. p. 368, and 377. Joh. Jakob Marxens Neu vermehrte Materialkammer.

This inconvenience may have induced artiſts to employ, inſtead of metallic duſt, that ſilver-coloured glimmer, known under the name of cat-ſilver, which has been long uſed in the like manner. So early as the laſt century, the miners at Reichenſtein, in Sileſia, collected and ſold for that purpoſe various kinds of glimmer, even the black, which acquires a gold-colour by being expoſed to a ſtrong heat *. The nuns of Reichenſtein ornamented with it the images which they made, as the nuns in France and other catholic countries ornamented their *agni Dei*, by ſtrewing over them a ſhining kind of talc †. The ſilver-coloured glimmer however has not ſuch a bright metallic luſtre as metallic duſt, but it nevertheleſs has a pleaſing effect when ſtrewed upon a white painted ground, and its light thin ſpangles or ſcales retain their brightneſs and adhere to the paper as long as it laſts. At preſent I am acquainted with no printed information reſpecting the method of laying on metallic duſt and glimmer, nor do I know where artiſts procure the latter, which in many countries is indeed not ſcarce. I ſhall here obſerve, that I once ſaw at Peterſburg a kind of Chineſe paper, which appeared all over to have a ſilver-coloured luſtre without being covered with any metallic ſubſtance, and which was exceedingly ſoft and pliable. It bore a great reſemblance to paper which has been rubbed over with dry ſedative ſalt or acid of borax. I conjecture that its ſurface was covered with a ſoft kind of talc, pounded extremely fine; but as I have none of it in my poſſeſſion at preſent, I can give no further account of it.

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* Volkmann, Sileſia ſubterranea. Leipzig 1720, 4to. p. 52.

† Pomet, Materialiſt und ſpecereyhandler. Leipzig 1717, fol. p. 826.

KERMES. COCHINEAL.

THOUGH a variety of information reſpecting the hiſtory of cochineal or kermes may be found ſcattered in the works of different authors, I ſhall venture to lay before the public what I have remarked on the ſubject: as I flatter myſelf with the hope of being able to rectify ſome errors of my predeceſſors, as well as to ſupply deficiencies which they have left; and as it will undoubtedly be agreeable to many readers to ſee collected in one point of view whatever is moſt important, with the addition of a few explanatory obſervations and notes.

Cochineal and kermes, as they appear in commerce, are ſmall grains, ſhaped almoſt like thoſe ſmall dried grapes without ſtones, which are called corinths. They are ſometimes of a deep, and ſometimes of a fainter reddiſh-brown, or violet-brown colour, are often covered with a gray duſt or mouldineſs, appear full of wrinkles, as ſucculent bodies generally do when dried, and for the moſt part are a little more raiſed on the one ſide than on the other. When theſe grains are chewed, they have a ſomewhat bitteriſh and aſtringent taſte, and communicate to the ſpittle a browniſh red colour. They are employed in medicine, but their principal uſe is in dyeing.

It is now well known that they belong to that genus of inſects called *coccus*, and that they are principally the dried females or the impregnated ovaria of different kinds. Entomologiſts have not yet ſupplied us with characteriſtics ſo preciſe as to enable us to diſtinguiſh the numerous ſpecies of theſe inſects; they have contented themſelves with giving them names according to the plants on which they are found; but for my purpoſe it will be ſufficient to take notice of only three kinds, with a few of their variations.

The firſt is the real American cochineal, that which at preſent is moſt uſed, but which at the ſame time is the deareſt. By Linnæus it is called *coccus cacti*. The ſecond kind is found chiefly on a ſpecies of oak, the *quercus ilex*, in the Levant, Spain, France, and other ſouthern countries, and is therefore called *coccus ilicis*, *coccus arborum*, and often alſo kermes. The third comprehends that ſaleable cochineal found on the roots of ſeveral perennial plants, which is known commonly under the appellation of Poliſh or German cochineal; though it is not certain whether thoſe produced upon the perennial knawel (*ſcleranthus*), bears-breech (*uva-urſi*) and other plants be the ſame ſpecies. They are often diſtinguiſhed alſo by the name of *coccus radicum*.

That the ſecond ſpecies has been mentioned by the ancient Hebrew, Greek, Latin, and Arabian writers cannot be denied; and to thoſe who know that our information reſpecting the nature of this commodity, which is perhaps even yet imperfect, has been in modern times procured after much labour and reſearch, will not be ſurpriſed to find their accounts mingled with many falſehoods and contradictions. The ancients muſt have been under more doubt and in greater ignorance on this ſubject, the leſs they were acquainted with the propagation of theſe inſects; but we ſhould be too precipitate were we to reject entirely every thing they have ſaid that may deviate from the truth; and I think it would be no difficult taſk to produce writers of the laſt and of the preſent century, whoſe information on this point is as dubious and incorrect as that to be found in the writings of the ancients.

All the ancient Greek [*] and Latin writers agree that kermes, called by the latter *coccum*, perhaps alſo *coccus*, and often *granum*, were found upon a low ſhrubby tree, with prickly leaves, which produced acorns, and belonged to the genus of the oak; and there is no reaſon to doubt that they mean *coccum ilicis*, and that low ever-green oak, with the prickly leaves of the holly (*aquifolium*), which is called at preſent in botany *quercus ilex*. This aſſertion appears more entitled to credit, as the ancients aſſign for the native country of this tree places where it is ſtill indigenous, and produces kermes.

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[*] By Dioſcorides they are called κοκκος βαφικη. Dioſcorides, iv. 48. p. 260. Reſpecting the tree, Pauſanias, lib. x. p. 890, ſeems to raiſe ſome difficulty, as he compares it to the σχινος, lentiſcus, or, as others read the word, σχοινος. But it has been remarked long ago, that the reading ought to be πρινος, ilex; and this alteration is ſupported by ſome manuſcripts.

According to the account of Dioſcorides, kermes were collected in Galatia, Armenia, Aſia, Cilicia, and Spain. Moſt commentators ſuppoſe that there muſt be here ſome error, as that author firſt mentions Galatia and Armenia, and then Aſia in general. Some, therefore, underſtand by the latter the city of Aſia in Lydia; others have altered or rejected the word altogether; and Serapion, in his Arabic tranſlation, ſeems to have read Syria. Profeſſor Tychſen, however, aſſured me that *Aſia proconſularis* is here meant, to which Cilicia did not belong; and in this particular ſenſe the word is often uſed by writers cotemporary with Dioſcorides. Of this difficulty Saumaiſe takes no notice.

We are informed by Pliny * that kermes were procured from Aſia and Africa; from Attica, Galatia, Cilicia, and alſo from Luſitania and Sardinia; but thoſe produced in the laſt-mentioned place were of the leaſt value. Pauſanias ſays that they were to be found in Phocis. As the *coccus* is mentioned likewiſe by Moſes and other Hebrew writers, kermes muſt have been met with at that period in ſome of the remote countries of the Eaſt †.

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* Plin. Hiſt. nat. lib. ix. cap. 41. lib. xvi. cap. 8. lib. xxii. cap. 2. lib. xxiv. cap. 4. The kermes of Galatia are mentioned by Tertullian, *de pallio*, p. 38. of the edition by De la Cerda, under the name of *Galaticus rubor*.

† Bochart. Hierozoicon, vol. ii. lib. iv. cap. 27. p. 624. Petri Ravanelli Bibliotheca ſacra. Genevæ 1660. fol. i. p. 480.

Bochart has quoted paſſages from the manuſcript works of Arabian authors, which undoubtedly allude alſo to kermes *; and I ſhall claſs among theſe, without any heſitation, the account of Cteſias, which has been copied by Photius, Ælian, and the poet Phile, though in more than one circumſtance it deviates from the truth †. It has already been conſidered by Tyſon and Delaval as alluding to kermes, or rather the American cochineal, which Tyſon, however, ſeems to confound with the *coccinella* genus of inſects, in English called the lady-cow ‡.

That the kermes-oak ſtill grows and produces kermes || in the Levant, Greece, Paleſtine, Perſia and India, is ſufficiently proved by the teſtimony of modern travellers. Bellon and Tourne-

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[*] I ſhall here give the tranſlation of one of theſe paſſages: Alkermez eſt animal quod in ſpinoſa planta generatur, et in arbuſto, ex quo ulphurata fiunt ad ignem accendendum, mediæ magnitudinis inter herbam et arborem, ramis multis, ſed tenuibus. Hoc autem animal inſtar lentis eſt initio valde parvum, ſed augeri non deſinit, donec ciceris magnitudinem aſſequatur.

[†] Photii Biblioth. p.152. Æliani Hiſt. animal. iv. 46. Phile de animal. propriet. p. 143.

[‡] The Anatomy of a pigmy, by Tyſon. London 1751, 4to. An Experimental inquiry into the cauſe of the changes of colours in opake bodies; by Ed. Huſ. Delaval. London 1777, 4to. p. 24.

[||] The inſect is not natural to the tree, but adventitious. As all roſe-buſhes have not tree-lice nor all houſes bugs; ſo all *ilices*, or oaks, have not kermes.

fort ſaw kermes collected in the iſland of Crete or Candia *; the former ſaw them alſo between Jeruſalem and Damaſcus †; and he informs us that the greater part of them was ſent to Venice. That they are indigenous in Perſia, is expreſsly affirmed by Chardin ‡. The kermes of Spain are ſo well known that it is not neceſſary to bring proofs of their being a production of that country. Dioſcorides ſays that the Spaniſh kermes were bad §; and we are expreſsly told by Garidel ‖, that they are ſtill of leſs value than the French.

With

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* Bellonii Itinerar. i. 17, p. 23. Voyage du Levant, par Tournefort, i. p. 19.

† Bellon. ii. 88. p. 145. See alſo Voyage de la Terre Sainte du P. Royer, Récollet, i. 2. and Voyages de Monconys, i. p. 179; Edward Brown's Merkwürdige Reiſen: aus dem Engliſchen überſetzt, Nurnberg 1750, 4to. p. 145; Mariti Reiſen durch Cypern, Syrien und Paleſtina. Altenburg 1777, 8vo. p. 155.

‡ Voyages de M. Chardin. A Rouen 1723. 12mo. ii. p. 313.

§ In oppoſition to this account ſome have aſſerted that Spaniſh kermes are praiſed in Petronius, cap. 119; but the paſſage varies ſo much, in different editions, that no certain concluſion can be drawn from it. See the excellent edition of Mich. Hadrianides. Amſtelod. 1669, 8vo. p. 419. If we even read, with Hardouin and others,

Heſperium coccum laudabat miles,

the ſoldier might mention kermes among thoſe productions of Spain of which he was fond, though he did not conſider them as the beſt. Hardouin ſays, *Loquitur de minio Hiſpanico*; but that was a colour for painting.

‖ Ils preferent le kermes de Provence et de Languedoc à ce-

With the real nature of kermes the ancients were not acquainted. By the greater part they were conſidered as the proper fruit of the tree; and although they remarked the inſects which proceeded from them, it was a common opinion that they were produced from putrefaction without propagation; and on this account they did not perceive their real origin. They imagined that the inſects were the effects of corruption; and Pliny ſpeaks as if he conceived that a certain ſpecies were liable to this fault more than others. They were therefore named *ſcolecion*, and leſs valued. But in another paſſage he calls kermes, not improperly, a ſcurf or ſcab of the tree, *ſcabies fruticis*. Dioſcorides ſays, that the kermes appeared on the tree like lentils *: a compariſon with which Matthiolus is highly diſpleaſed; but it cannot be altogether unnatural, as many of the moderns, who never read the writings of the Greeks, compare them alſo to lentils or peas. The account, that a kind of kermes in Sicily, like ſmall ſnails, were collected by the women with their mouths, ſeems to be attended with more difficulty. The compariſon of ſnails, which may not be altogether inconſiſtent, I ſhall admit; but the

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lui d'Eſpagne, parceque le premier donne une teinture plus vive; celui qui vient ſur les arbriſſeaux voiſins de la mer, eſt plus gros et d'une couleur plus éclatante que celui qui vient aux autres endroits. *Hiſtoire des plantes qui naiſſent aux environs d'Aix.* A Aix 1715. fol. p. 253.

* Προσκεινται δὲ κοκκοι ὡς φακοι.

gathering with the mouth is too much contrary to common ſenſe not to be diſputed. Commentators, therefore, have propoſed various emendations, which ſeem to be drawn from the different readings; but the common one alluded to muſt be very old, as it has been adopted by Serapion in his tranſlation [*]. Marcellus and Cornarius are of opinion that a word muſt be inſerted, expreſſive of the time when the kermes were gathered; and that inſtead of "with the mouth" ought to be read "in ſummer [†]." For my part, I think a word ſignifying ſome inſtrument employed by the woman in collecting them would be more proper; for the Grecian women, according to Bellon's account, uſe ſtill for that purpoſe a ſmall inſtrument ſhaped like a ſickle. In France [‡] and other countries, the women ſuffer the nails of their fingers to grow, in order that they may aſſiſt them in their labour [||].

However

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[*] Serapion ſays, according to the Latin tranſlation, cap. 311. p. 210: Reperitur in arbore glandium interius Calchiæ animal teſtoſum, parvum, ſimile limacis; et colligunt illud mulieres cum ore earum.—In my opinion the compariſon of kermes to a ſnail refers only to the empty huſks when the inſects are dried. Garidel ſays, p. 248, Le kermes dans ſa perfection, et lorſqu'on le ramaſſe, ſe préſente à nos yeux comme une gouſſe dont la peau eſt aſſez ferme - - - - Cette gouſſe eſt ordinairement ronde, plus ou moins groſſe qu'un pois.

[†] Theſe writers propoſe to read εν τῳ θερει inſtead of τῳ ϛοματι: but the variation here is too great to be admitted.

[‡] Garidel, p. 254: Leur habilité conſiſte ſur tout à avoir les ongles longs.

[||] Having mentioned the above paſſage to profeſſor Tychſen, However this may be, both Dioſcorides and Galen aſcribe to kermes an aſtringent, bitter taſte; but I ſhall leave to the examination of phyſicians the medicinal qualities for which they have extolled them. I ſhall remark only, as a technologiſt, that kermes were uſed formerly, in dyeing purple, to give what is called the ground; but our dyers employ them to communicate a ſcarlet colour, which, without doubt, excels the purple of the ancients.

The firſt-mentioned uſe of kermes in dyeing ſeems to have been continued through every century. In the middle ages, as they are called, we meet with kermes under the name of *vermiculus* or *vermiculum*; and on that account cloth dyed with them was called *vermiculata*. Hence the French word *vermeil*, and its derivative *vermilion*, as is well known, had their extraction; the latter of which originally ſignified the red dye of kermes, but it is now uſed for any red paint, and alſo for fine pounded cinnabar. In France and Spain, at

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he ſuggeſted an emendation which, in my opinion, is preferable to any I have hitherto ſeen: "We muſt read," ſaid he, "τῷ ϛονυχι, which tranſcribers may have readily miſtaken and changed into the word ϛοματι, with which, perhaps, they were better acquainted. Στονυξ ſignified not only the extremity of the nail, but alſo any kind of inſtrument, and even weapons, in which laſt ſenſe it occurs more than once in Lycophron." See *Heſychius*. Much more forced and improbable is the amendment propoſed by Saumaiſe, which may be found in his Annotations on Solinus.

preſent, kermes, as ſoon as they are gathered, are beſprinkled with vinegar and dried in the ſun; but it appears that in the middle ages they were not dried ſufficiently, and that they were put into leather bottles to prevent them from making their eſcape*. In preparing the liquid dye, dyers uſed

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* The following paſſage, highly worthy of notice, taken from *Gervaſii Tilberienſis Otia Imperialia ad Ottonem IV. Imperatorem*, iii. 55; a work which the author, a very learned man for his time, wrote in the year 1211, will ſerve to illuſtrate what I have ſaid above: De vermiculo. In regno Arelatenſi *(kingdom of Arles, which formerly belonged to the dukes of Burgundy)* et confinio maritimo eſt arbor cujus ſarcina pretium facit duodecim nummorum Wighornienſium. Ejus fructus in flore facit pretium quinquaginta librarum. Ejus cortex ad onus veſtis pretium habet quinque ſolidorum. Vermiculus hic eſt, quo tinguntur prætioſiſſimi regum panni, ſive ſerici, ut examiti, ſive lanei, ut ſcharlata. Et eſt mirandum, quod nulla veſtis linea colorem vermiculatum recipit, ſed ſola veſtis quæ ex vivo animanteque vel quovis animato decerpitur *(The author here is undoubtedly right, as animal ſubſtances take a dye more readily than vegetable)*. Vermiculus autem ex arbore, ad modum ilicis et quantitatem dumi pungitiva folia habente, prodit ad pedem, nodulum faciens mollem ad formam ciceris *(the ſame compariſon as that of Dioſcorides)*, aquoſum, et, cum exterius colorem habeat nebulæ et roris coagulati, interius rubet; et cum ungue magiſterialiter decerpitur, ne, tenui rupta pellicula, humor incluſus effluat, poſtquam exſiccatur et corio includitur.—Cum enim tempus ſolſtitii æſtivi advenerit, ex ſe ipſo vermiculos generat, et niſi coriis ſubtiliter conſutis includerentur, omnes fugerent aut in nihilum evaneſcerent. Hinc eſt, quod vermiculus nominatur propter diſſolutionem quam in vermes facile facit, ex natura roris maialis, a quo generatur; unde et illo tantum menſe colligitur. Arbor autem vermiculum generans vulgo Analis nuncupatur.—This book may be found

Egyptian alum, the only kind then to be had, and alſo urine [*]. This dye ſeems to have been known in Germany ſo early as the twelfth century; for among the productions of the country which Henry the Lion ſent as a preſent to the Greek emperor we find *ſcarlata* [†].

Our

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in *Leibnitii Scriptor. rerum Brunſvic.* I.—Mader cauſed only a ſmall part of it to be printed, which I remark in order to rectify a miſtake I committed in my *Phiſikal-œkonom. biblioth.* xv. p. 550.

[*] Muratori has publiſhed, in the ſecond part of *Antiquitat. Italic. medii ævi*, p. 379, a treatiſe which appears to have been written in the ninth century, or in the time of Charlemagne, and which contains a great many receipts reſpecting dyeing and other arts. Among theſe is the receipt then commonly uſed for dyeing red: *Compoſitio vermiculi.* It is much to be regretted that the manuſcript was ſo illegible that there are whole paſſages entirely deſtitute of ſenſe; and that many words occur of which no one has given, or perhaps ever will be able to give, an explanation. We find, however, that the kermes were boiled with urine in a linen bag *(in linteolo raro): addis hurinam expumatam.* The other ingredients I confeſs I do not underſtand. What is *luzarim, lulacim, quianus, coccaris?* Many of theſe words ſeem to ſignify not ſimple but compounded pigments. *Lulacim*, by p. 378, appears to have been the expreſſed juice of ſome plant boiled with alum. *Coccarin naſcitur in ſolio cedrin non tritæ.* Beſides the word *vermiculum*, the word *coccum* alſo occurs: *Coccum delabas in urina.* In the laſt ſentence we ought to read *coctum.*

[†] See Barth. ad Guil. Britonis Philippidos libr. xii. Cygneæ 1657, 4to. p. 614. Arnoldus Lubecenſis, at the end of Helmoldi Chronicon Slavorum, lib. iii. cap. 4: Præmiſerat autem dux munera multa et optima juxta morem terræ noſtræ, equos

pulcerrimos

Our anceſtors, in all probability, procured their kermes from the ſouthern part of France, or rather from Spain. The Arabians, who from the earlieſt pe-

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pulcerrimos ſellatos et veſtitos, loricas, gladios, veſtes de ſcharlatto et veſtes lineas tenuiſſimas. See *Fiſchers Geſchichte des Teutſchen handels.* Hanover 1758, 8vo. i. p. 490. But can *munera juxta morem terræ noſtræ* be with propriety tranſlated ‘the productions of the country?’ With all due reſpect to the extenſive reading and great learning of profeſſor Fiſcher, I muſt warn the reader againſt ſome errors which occur in his book, and againſt his too bold aſſertions. From what he ſays, p. 448, one would ſuppoſe that he compared the kermes to our acorns; but the fruit only of the kermes-tree, as being a ſpecies of oak, has the figure of an acorn. In p. 493 he ventures to criticiſe profeſſor J. H. Schulze, who, in *Diſſertat. de granorum kermes et coccionellæ convenientia, viribus et uſu*, Halæ 1743, adopts the opinion of a Dutchman (not an Engliſhman) De Ruuſcher, which has been completely juſtified, that cochineal is an inſect. According to profeſſor Fiſcher, both the inſect and the acorn are cochineal. He talks of plantations of the kermes tree among the ancients, and ſeems to believe that the Celts brought kermes along with them to Galatia, from their original country, in the ſame manner as the Europeans carried with them to America the corn of Europe. Kermes, however, are inſects which cannot be tranſplanted, and I do not find any proof that there ever were plantations of them. People collected kermes in the places where they happened to find them. The compariſon of cochineal with the lady-cow, or lady-fly, as it is called, p. 493, is altogether improper, as that inſect is the *coccinella*, which has no affinity to cochineal. His propoſal to place the *coccinellæ*, or lady-flies, on the kermes-oak, or on the *ſcleranthus* (perennial knawell), is totally impracticable; and even if that food ſhould agree with theſe inſects, they would never, were they to remain for eternity, become cochineal or kermes.

riods had been acquainted with this production in Africa, found it in Spain, and employed it there for dyeing, and as an article of commerce; and on this account, as appears, the Arabic name *kermes*, or *alkermes*, became ſo common [*]. Saumaiſe thinks that the Arabs borrowed this word from the Latins, and that it is formed from *vermes* [†]; but even if we allow that it is not an original Arabic word, it is, perhaps, more probable that it is of Celtic extraction, as is the opinion of Aſtruc [‡]. *Guer*, or *quer*, ſignified in the Celtic language a green (ever-green) oak; and, in Lower Languedoc, uncultivated land, on which the kermes-oak grows, is ſtill called *garrigues*. From this *guer* or *quer* Aſtruc wiſhes to derive alſo the Latin word *quercus*, the etymology of which is no where elſe to be found. This conjecture is of the more importance as *mes*, in ſome parts, ſignifies the fruit of the oak; ſo that *guermes*, or kermes, would be the acorns, *les glands du cheſne*. Although kermes are not acorns, we cannot reject this appellation as improbable. Having requeſted the opinion of profeſſor Tychſen, as being well acquainted with the Arabic language, on this ſubject, he readily complied with my deſire, and I have given it, in the note below, in his own words *. It deſerves to be remarked, that *carmeſin*, *carmin*, *cramoiſi* of the French, and *charmeſi*, *chermeſino* of the Italians, and other like words, hence derive their origin.

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[*] Matthiolus, in his Annotations on Dioſcorides, p. 725, ſays that the monks who wrote a commentary on Meſues aſſert that the kermes of the Arabians, the *coccus radicum*, is not the *coccus arborum*; but he refutes this idea upon the grounds that the Arabians themſelves ſay every thing of their kermes that is related of them by Dioſcorides. I am almoſt induced to conjecture that the monks made this aſſertion in order to render more agreeable that tribute which was paid to them, in ſome countries, under the name of St. John's blood.

[†] Salmaſius in Solinum, p. 854.

[‡] Mémoires pour l'hiſtoire naturelle de Languedoc. Paris 1737, 4to. p. 472.

The coccus found on the roots of ſome plants, as far as I know, has not been mentioned by the ancients. That theſe inſects, however, were collected in Germany in the twelfth century, was firſt proved

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* The word *kermes*, *karmes*, and, with the article, *al kermes*, is at preſent in the Eaſt the common name of the animal which produces the dye, as well as of the dye itſelf. Both words have by the Arabs and the commerce of the Levant been introduced into the European languages. *Kermes*, Span. *al charmes*, *al quermes*, or more properly *alkermes*, *alkarmes*. Ital. *cremeſino*, &c.

To what language the word originally belongs cannot with certainty be determined. There are grounds for conjecturing ſeveral derivations from the Arabic: for example, *karaſa*, *extremis digitis tenuit*, which would not ill agree with ϛονυξ; and *karmis* ſignifies *imbecillus*; but this word may be derived from the ſmall inſect, as well as the inſect from it. As all theſe derivations, however, are attended with grammatical difficulties, and as the Arabians, according to their own account, got the dye and the word from Armenia, it appears rather to be a foreign appellation which they received with the thing ſignified, when they over-ran proved, as I think, by J. L. Friſch *. We are told that in this, and at leaſt in the following century,

over-ran Upper Aſia. Jbn Beithar in *Bochart*, *Hierozoicon*, ii. p. 625, calls kermes an Armenian dye ; and the Arabian lexicographers, from whom Giggeus and Caſtellus made extracts, explain the kindred word *karmaſal*, *coccineus*, *vermiculatus*, as an Armenian word.

This dye however was undoubtedly known to the Hebrews, the Phœnicians and the Egyptians long before the epoch of the Arabians in the Eaſt. Among the Hebrews the dye occurs, though not clearly, under other names, *tola ſchani*, or ſimply *tola*, in their oldeſt writer, Moſes. *Tola* is properly the worm ; and, according to the analogy of *kermes*, worm-dye, ſcarlet. The additional word *ſchani* ſignifies either double dyed, or, according to another derivation, bright, deep red dye. For both ſignifications ſufficient grounds and old authorities might be quoted; but the former is the moſt uſual, and, on account of its analogy with διβαφον, ſeems to be the moſt probable.

But was the *coccus* known ſo early ? Is not *tola*, the worm-dye, perhaps the ſame with purple, becauſe the ancients made no diſtinction between *vermis* and ſnail ? I believe not. For purple the Orientals have a particular name, *argaman*, *argevan*, which is accurately diſtinguiſhed from *tola*, and is often added to it as ſomething diſtinct. All the ancients therefore tranſlate the Hebrew word *tola* by κοκκος, kermes, *zehori* and *zehorito* (deep red, bright dye), which words they never put for *argaman*. As the Phœnicians traded at ſo early a period with Spain and other countries, where the kermes are indigenous, it may be readily comprehended how that dye was known in Paleſtine about and beſore the time of Moſes.

It

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* Beſchreibung von allerley inſekten ; fünfter theil, Berlin 1736, 4to. p. 10.

tury, ſeveral monaſteries cauſed their vaſſals to collect this *coccus*, and bring to them by way of tribute.

It muſt have been known alſo in Egypt about the ſame epoch; for when Moſes, in the wilderneſs, required ſcarlet to ornament the tabernacle, it could have been procured only from that country. Whether kermes be indigenous in Egypt, I do not know. On the word καλαΐνον, quoted by Bochart from Heſychius as Egyptian, the abbreviation of which, *laia*, in the Ethiopic language ſignifies ſcarlet, I lay no great ſtreſs, becauſe it cannot be proved, 1ſt, that the word is originally Egyptian, as it occurs ſeveral times in the Greek writers and in various ſignifications; and 2dly, that it ſignifies ſcarlet dye, becauſe the ancients explain it ſometimes by purple, ſometimes by ſea-colour. See *Bochart*, l. c. p. 730. If the word be Egyptian, it ſignifies rather red dye in general than defines purple colour. At any rate, there is in Coptic for the latter a peculiar word, *ſcadſchi*, or *ſanhadſchi*. The latter is explained by Kircher in *Prodrom. Copt.* p. 337, *mercator purpuræ, vermiculus coccineus, purpura*, which is altogether vague and contradictory. The Arabic lexicographer, whom he ought to have tranſlated, gives a meaning which expreſſes only *purple ware*.

If one might venture a ſuppoſition reſpecting the language of a people whoſe whole hiſtory is almoſt bare conjecture, I would aſk if the Coptic *dholi* was the name of ſcarlet in Egypt. The lexicographers explain it by a worm, a moth; but in thoſe paſſages of the tranſlation of the Bible which I have compared another word is always uſed, when alluſion is made to worms which gnaw or deſtroy. Was *dholi* the name of the worm that yields a dye? As *dholi* ſounds almoſt like the Hebreo-Phœnician *tola*, we might farther conjecture that the Egyptians received both the name and the thing ſignified from the Phœnicians. But this is mere opinion. The following concluſions ſeem to be the natural reſult of the above obſervations:

1ſt. Scarlet, or the kermes-dye, was known in the Eaſt in the earlieſt ages, before Moſes, and was a diſcovery of the Phœnicians bute*, and that thoſe who could not deliver the production in kind were obliged to pay, in its ſtead, a certain ſum of money. The meaſure by which it was delivered was called *coppus*, in German *kopf*; which word ſignified, formerly, not only a globular drinking veſſel, but alſo a meaſure

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cians in Paleſtine, but certainly not of the ſmall wandering Hebrew tribes.

2d. *Tola* was the ancient Phœnician name uſed by the Hebrews, and even by the Syrians; for it is employed by the Syrian tranſlator, Iſaiah, chap. i. v. 18. Among the Jews, after their captivity, the Aramæan word *zehori* was more common.

3d. This dye was known alſo to the Egyptians in the time of Moſes; for the Iſraelites muſt have carried it along with them from Egypt.

4th. The Arabs received the name kermes, with the dye, from Armenia and Perſia, where it was indigenous, and had been long known; and that name baniſhed the old name in the Eaſt, as the name ſcarlet has in the Weſt. For the firſt part of this aſſertion we muſt believe the Arabs.

5th. Kermes were perhaps not known in Arabia; at leaſt they were not indigenous, as the Arabs appear to have had no name for them.

6th. Kermes ſignifies always *red dye*; and when pronounced ſhort, it becomes *deep red*. I conſider it, therefore, as a mere error of the tranſlation when, in *Avicenna*, iii. Fen. 21, 13, *kermeſiah* is tranſlated *purpureitas*. It ought to be *coccineum*.

* The ancient Spaniards, according to Pliny's account, were obliged to pay tribute in kermes to the Romans; and we are told by Bellon, that the Turks exact a tribute of the like kind from the modern Greeks. It appears, therefore, that the monks imitated the example of the Romans.

both for dry and liquid things. It is ſtill retained in the latter ſenſe in Zurich, Achen, Regenſburg, Auſtria, and ſeveral other places [*]. As the *coccus* was gathered at midſummer (St. John's day), it was called St. John's blood; probably, becauſe the clergy wiſhed by that appellation to make this revenue appear as a matter of religion; and that name is ſtill continued among the country people. As the monks and nuns carried on at that time various trades, particularly that of weaving, they could employ the St. John's blood to very good purpoſe [†].

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[*] See Friſch's Teutſches Wörterbuch, and Krunitz's Encyclopedie, xliv. p. 2.

[†] In Leibnitii Collectanea etymologica, Hanoveræ 1717, 8vo. p. 467, there is a catalogue of the effects and revenues of the church at Prum, where a monaſtery of Benedictines was eſtabliſhed ſo early as the eighth century. *Regiſtrum bonorum eccleſiæ Prumienſis.* This catalogue, which was drawn up in the year 1222, ſays: *Solvit unuſquiſque pro vermiculo denarios ſex.* But becauſe alluſion is made here to people who lived near Metz in Lorraine, it may be conjectured that we are to underſtand not *coccus radicum*, but *coccus arborum*, which they might have procured from thence. For this doubt, however, there is no room in *Deſcriptio cenſuum, proventuum ac fructuum ex prædiis monaſterii S. Emmerammi*, in the year 1301, to be found in *Pezii Theſaurus anecdotorum noviſſimus*, Auguſtæ Vindel. 1721, fol. i. p. 69. We are there told, *Singuli dant ſex denarios pro vermiculo*; and p. 69 and 74: *ſinguli dant vaſculum vermiculi*; p. 76: *reddunt vermiculi coppos duo.* The people of whom theſe paſſages ſpeak belonged to the monaſtery of St. Emmeran, at Regenſburg, and were ſettled in Bavaria. Papon relates in *Hiſtoire*

At later periods I find mention of the *coccus* only in the works of naturaliſts, ſuch as thoſe of Cornarius[*], Scaliger[†] and others; but how long the uſe of it, and the collecting of it for religious houſes, continued, I cannot determine; perhaps longeſt in Poland. From that country, even at preſent, a conſiderable quantity of it is ſent every year to Venice; and I am inclined to believe that ſome of it is collected ſtill in the county of Mark, and other parts of Germany. The following, as far as I can find, are the reaſons why this indigenous production has loſt its value. Firſt, the root-kermes contain leſs of the colouring ſubſtance than the kermes of France and Spain. Secondly, the collecting of the former is more laborious as well as more tedious; and after they ceaſed to be paid *in natura* to the monaſteries, they became too dear to ſtop the ſale of thoſe of France and Spain. But when the American cochineal, which

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Hiſtoire générale de Provence, Paris 1778, 4to. ii. p. 356, that the archbiſhop of Arles, in the middle of the twelfth century, ſold to the Jews the kermes collected at St. Chamas and other parts of his dioceſe.

[*] Naſcitur in Sarmatia ad Ruſſiam ſpectante, in Podolia appellata regione, herba ſimilis plantagini, quæ arno-gloſſum appellatur. Ad hujus radicem granum unum adnaſcitur, - - - quo, ad finem Maii et Junii principium, per quatuor hebdomadas collecto, antequam in vermem, alas poſtea acquirentem, abeat, ſerici et alii panni inficiuntur eo colore quem noſtri *ſcharlach* et *kermaſin* vocant. *In Dioſcoridem*, iv. 39.

[†] De ſubtilitate; exercit. 325, § 13.

is undoubtedly a far ſuperior pigment, was in latter times made an article of commerce, and was ſent to Europe in large quantities for dyeing, and becauſe it could be procured at all times, and in abundance, at a price which, if not ſmall, was at leaſt moderate, conſidering its excellent quality, from Mexico, where labour was cheaper *, and where it was cultivated in plantations formed on purpoſe, the French and Spaniſh kermes were entirely forgotten, as appears by a French ordinance of 1671 reſpecting dye-ſtuffs: and this was the caſe much more with the German, which, in all probability, will never turn to great account, though ſome have entertained a contrary opinion.

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* The price of cochineal has in latter times fallen. In the year 1728 it coſt fifty-eight ſchellings Flemiſh per pound; but in May 1786 it coſt only twenty-ſeven and a half. In *Schrebers Erſter Sammlung der Cameral Schriften*, part ſecond, Halle 1758, p. 277, there is an egregious error in this reſpect, as is uſual in ſuch works. The price there is ſtated to be twenty-ſeven and a half rix-dollars Flemiſh per pound. In the firſt volume of the Hiſtory of Inventions, in the article Lacmus, I have been led to make an erroneous aſſertion by falſe information. Sifted cochineal is commonly half a ſchelling Flemiſh, or three ſtyvers, dearer than unſifted. It is often adulterated in Spain, but oftener in Holland, with the wild cochineal, as it is called. Some years ago an Engliſhman adulterated this article by mixing it with red wax; but the fraud required too laborious preparation, and was attended with too little profit to be long continued. The latter information is taken from a letter of Mr. Rieſemann, dated Amſterdam, June 1788.

Mexico, or New Spain, the original country of the cochineal, which word appears to be the diminutive of *coccus*[*], was diſcovered by the Spaniards in 1518 and the years following. Who firſt remarked this profitable production and made it known in Europe, I have not been able to diſcover. Some aſſert that the native Mexicans, before they had the misfortune of being viſited by the Chriſtians, were acquainted with cochineal, which they employed in painting their houſes and dyeing their clothing [†]; but others maintain the contrary [‡]. The Spaniards, who had long uſed kermes in their own country, could not fail ſoon to obſerve the ſuperiority of the American; and I find by Herrera, that the king in the year 1523 deſired to be informed by Cortez, whether what he had been told was true, that kermes were to be found in abundance in Mexico, and if they could, as was ſuppoſed, be ſent with advantage to Spain. He requeſted him, ſhould this information be true, to pay attention to it, and to cauſe them to be collected with diligence *. This commodity muſt ſoon after have begun to be an object of commerce; for Guicciardini, who died in 1540, mentions cochineal among the articles procured then by the merchants of Antwerp from Spain †. The plant on which the animal lives, belongs to the genus of the *cactus*, and in Mexico is called *nopal* or *tuna*, though ſeveral plants of the ſame kind ſeem to be comprehended under the latter name. One kind is the *opuntia*, which has become indigenous in Spain ‡, Portugal, and Italy, and which is not ſcarce in our green-houſes. Whether the *cochinillifera* be already ſufficiently deſcribed, is ſtill doubtful; and according to the lateſt information, there is reaſon to believe that it is not. Oviedo ‖ deſcribed and gave figures of two kinds

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[*] There is reaſon to think that the Spaniards gave as names to ſeveral American articles the diminutives of like Spaniſh or European productions. Thus *ſarſaparilla* ſignifies prickly vineſtock; *platina* little ſilver. Is the cauſe of this to be referred to the Spaniſh *grandezza*?

[†] Raynal, in Hiſtoire philoſophique des établiſſemens dans les Indes. Geneve 1780, 4 vol. quarto, ii. p. 77.

[‡] Algemeine geſchichte der länder und völker von Amerika, Halle 1753, 2 vol. quarto, ii. p. 7.

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* Y aviendo tenido el Rey noticia, que en Nueva Eſpaña nacia grana en abundancia, y que trayda a Caſtilla podia redundar en mucho provecho para las rentas reales, mandò al Governador que lo miraſſe, y hizieſſe coger, y aviſaſſe luego ſi eſto era verdad, y que le parecia, que para beneficiarla ſe podia hazer. *Hiſtoria general de los hechos de los Caſtellanos en las iſlas y tierra firme del mar oceano*, por Antonio de Herrera. En Madrid 1601, fol. decada tertia, v. 3. p. 194.

† See Anderſon's Geſchichte des handels, iv. p. 73. It is poſſible however that Guicciardini may have meant Spaniſh kermes.

‡ See Ueber ſitten, temperament und gerichtshöfe Spaniens; von einem reiſenden beobachter. Leipzig 1782, 2 parts, 8vo. i. p. 108.

‖ Hiſtoire naturelle et générale des Indes. Paris 1556, fol. p. 122, 130.

of

of *tuna*; but of the cochineal he makes no mention. He ſpeaks however of an excellent dye which the Americans prepared from the fruit, and formed into ſmall cakes; but he afterwards acknowledges that he had received no authentic account on this ſubject. I nevertheleſs ſuſpect that theſe cakes were made of cochineal; for Hernandez ſays, that ſuch were made in his time.

With the firſt cochineal, a true account of the manner in which it was procured muſt have reached Europe, and become publicly known. Acoſta, in 1530, and Herrera in 1601, as well as Hernandez and others, gave ſo true and complete a deſcription of it, that the Europeans could entertain no doubt reſpecting its origin. The information of theſe authors, however, was either overlooked or conſidered as falſe, and diſputes aroſe whether cochineal was inſects or worms, or the berries or ſeeds of certain plants. The Spaniſh name *grana*, confounded with *granum*, may have given riſe to this conteſt; but there is not, perhaps, in all natural hiſtory a point which can be ſo fully cleared up as this can by the moſt undoubted teſtimony. A Dutchman, named Melchior de Ruuſcher, affirmed in a ſociety, from oral information he had obtained in Spain, that cochineal was ſmall animals. Another perſon, whoſe name he has not made known, maintained the contrary with ſo much heat and violence, that the diſpute at length ended in a bet. Ruuſcher charged a Spaniard, one of his friends, who was going to Mexico, to procure for him in that country authentic proofs of what he had aſſerted. Theſe proofs, legally confirmed in October 1725, by the court of juſtice in the city of Antiquera, in the valley of Oaxaca, arrived at Amſterdam in the autumn of the year 1726. I have been informed that Ruuſcher upon this got poſſeſſion of the ſum betted, which amounted to the whole property of the loſer; but that, after keeping it a certain time, he again returned it, deducting only the expences he had been at in procuring the evidence, and in cauſing it to be publiſhed. It formed a ſmall octavo volume, with the following title, printed in red letters: *The Hiſtory of Cochineal, proved by authentic documents* *. Theſe proofs ſent from New Spain are written in Dutch, French, and Spaniſh.

It may be readily ſuppoſed, that the high eſteem in which this production was held, would ſoon induce people to endeavour to convey theſe inſects to other countries in order to breed them. This the Spaniards did every thing in their power to prevent: and notwithſtanding the ſeverity of the means which they employed, attempts were made for that purpoſe; but they never ſucceeded, and have now been abandoned. When Rolander, a ſcholar of Linnæus, was in America, he ſent to Upſal, at the requeſt of that celebrated naturaliſt, a plant, with the inſects upon it. The plant arrived in the year 1756, when Linnæus was engaged with his pupils. The gardener, who was not acquainted with the nature of it, cleared it from what he thought vermin, and planted it; ſo that Linnæus, when he returned from his claſs, did not find a ſingle inſect alive. This circumſtance, which he has mentioned in his *Syſtema Naturæ*, I was told by himſelf. I am however of opinion, that this was not the real cochineal, but the other kind ſpoken of by Sylveſter; as the former, according to the lateſt information, can ſcarcely be procured even with more labour and expence than Rolander could beſtow, and could hardly ſtand ſuch a long voyage to the northern regions. The ſpurious kind were ſent from Jamaica to England, on the *Opuntia ficus Indica*, which was planted by Miller*, but the inſects did not live above three or four months. Thiery, a young French naturaliſt, brought the real cochineal to St. Domingo in the year 1777, at ſo much hazard that he deſerves a place in the martyrology of the naturaliſts; but after his death, which ſoon followed, the inſects periſhed through the avarice or negligence of his ſucceſſors; and in that iſland there are none now to be found but the ſpurious kind *.

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* The title in the original is: *Natuerlyke hiſtorie van de couchenille, beweezen met authentique documenten.* Hiſtoire naturelle de la cochenille, juſtifiée par des documens authentiques. T'Amſterdam. By Hermanus Uytwerf, 1729, 8vo. 175 pages. This work, which I have in my poſſeſſion, is ſcarce. A tranſlation of it however may be found in (C. Mylius) Phyſikaliſchen beluſtigungen; Berlin 1751, 8vo. i. p. 43.

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* Miller's Gardener's Dictionary.

I am inclined to believe that the art of employing kermes to dye a beautiful red colour was diſcovered in the Eaſt at a very early period; that it was ſoon ſo much improved as to excell even the Tyrian purple; and that it contributed to cauſe the proper purple to be at length abandoned. From the coſtly red dyes extolled ſo much by the Hebrew writers, and which, according to the opinion of learned commentators, were made from kermes, I ſhall not venture to adduce any proofs, as I am not acquainted with the Oriental languages to examine their accounts with accuracy; but I have found a paſſage in Vopiſcus †, which ſeems to render

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[*] Traité de la culture du nopal et de l'éducation de la cochenille. Au Cap-François 1787, 8vo. Of this work, which deſerves notice, I have given a particular account in my *Phyſikaliſch-œkonom. Bibliothek*, xv. p. 594.

[†] Genus purpuræ, quod poſtea nec ulla gens detulit, nec Romanus orbis vidit, de qua pauca ſaltem libet dicere. Meminiſtis enim fuiſſe in templo Jovis Optimi Maximi Capitolini pallium breve purpureum laneſtre, ad quod cum matronæ atque ipſe Aurelianus jungerent purpuras ſuas, cineris ſpecie decolorati videbantur cæteræ divini comparatione fulgoris. Hoc munus rex Perſarum

der my conjecture very probable. That author informs us, that the king of Perſia ſent to the emperor Aurelian, beſides other articles of great value, ſome woollen cloth, which was of a much coſtlier and brighter purple colour than any that had been ever ſeen in the Roman empire, and in compariſon of which all the other purple cloth worn by the emperor and the ladies of the court appeared dull and faded. In my opinion, this cloth, which was of a beautiful purple red colour, was not dyed with the liquor of the murex but with kermes. This idea was indeed not likely to occur to the Romans, who were acquainted only with the purple of the murex, and who had leſs experience in the arts in general than in that of robbing and plundering, or who at any rate in that reſpect were inferior to the Orientals. The Roman emperors cauſed this ſuppoſed purple to be ſought for in India by the moſt experienced dyers, who, not being able to find it, returned with a vague report that the admired Perſian purple was produced by the plant ſandix. I am well aware, that ſome commentators have ſuppoſed that the ſandix

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Perſarum ab Indis interioribus ſumptum, Aureliano dediſſe perhibetur, ſcribens: Sume purpuram qualis apud nos eſt. Sed hoc falſum fuit. Nam poſtea diligentiſſime et Aurelianus et Probus et proxime Diocletianus, miſſis diligentiſſimis confectoribus, requiſiverunt tale genus purpuræ, nec tamen invenire potuerunt. Dicitur enim ſandix Indica talem purpuram facere, ſi curetur. *Vopiſcus in Vita Aureliani*, cap. 29.

ſandix was our madder *. Heſychius, however, ſays, very confidently, that the *ſandix* is not a plant, but a kind of ſhrubby tree which yields a dye like the *coccus* †. The Roman dyers, perhaps, prejudiced in favour of the murex, made that only the object of their ſearch; and their labour proving fruitleſs, they might have heard ſomething of kermes, or the kermes-oak, which they did not fully underſtand. Our dyers, even at preſent, believe many falſe accounts reſpecting the dye-ſtuffs which they uſe daily.

In latter times, when it was known that the beautiful Oriental kermes-dye was not properly purple, it was no longer called by that name, but was conſidered as a new dye, and acquired a new appellation. Cloth dyed with it was called *ſcarlata*, *ſquarlata*, *ſcarleta*, *ſcarlatina*, *ſcharlatica*. That theſe words have an affinity to our ſcarlet, every one allows, but it may be difficult to diſcover their origin. Pezronius * affirms, that they are of Celtic extraction, and have the ſame ſignification as *Galaticus rubor*. Aſtruc, as I have already ſhewn, derives kermes frem the ſame language, which, however, like the Egyptian hiſtory, is often employed to explain what people cannot otherwiſe explain, becauſe ſo little is known of both that much contradiction is not to be apprehended. Others wiſh to make ſcarlet from the *quiſquilium*, *cuſculium* or *ſcolecium* of Pliny. To ſome the word appears to be compoſed of the firſt half of kermes and lack, with the addition of only an S, and every one is left at liberty to determine at pleaſure, whether lack is to be underſtood as the Arabic for red, or the German word *lacken* cloth. In the firſt caſe it ſignifies the ſame as *vermiculare rubrum*; in the latter *pannus vermicularis*. Stiler † ſays *ſcarlach* is entirely German, and compounded of *ſchor* the fire, and *laken* cloth, ſo that its real ſignification is fire-cloth, fire-coloured cloth. Reiſke, on the other hand, aſſerts, that the word is originally the Arabic *ſcharal*, which means the kermes dye *. Which of theſe conjectures is moſt agreeable to truth, cannot with certainty be concluded; but that the word is older than Dillon affirms it to be, on the authority of a Spaniard, can be proved. Dillon ſays that it was firſt uſed by Roderick, archbiſhop of Toledo, who finiſhed his hiſtory of Spain in 1243 †. Voſſius ‡ has quoted ſeveral writers who uſe *eſcarletum* or *ſcarletum*. The oldeſt is Cæſarius, who lived about the year 1227. Matthew Paris, who wrote about the year 1245, uſed the word in

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* Thoſe who are deſirous of farther information reſpecting the *ſandix*, may conſult Saumaiſe on Solinus, p. 810, and the editor of the *Cyneget.* of Gratius Faliſcus, x. 86. p. 46.

† Σανδυξ, δενδρον θαμνωδες, ὁυ το ανθος χροιαν κοκκῳ εμφερη εχει. Some have conſidered ſandix as a mineral. Minerals however can be uſed for painting but not for dyeing. It may be replied that the Romans themſelves dyed with kermes at this period, and that they muſt have eaſily procured it. But they underſtood the art of dyeing with it ſo badly that they employed it only for giving the ground of their purple, and on that account it muſt have appeared improbable to them that the people in India could produce by it a more beautiful colour than their purple was. From the like ignorance in modern times, indigo was decried, becauſe people imagined that a complete colour could not be communicated by it; and this falſe concluſion retarded many improvements in the art of dyeing. It is very likely that the Greeks and the Romans were unacquainted with the effect produced upon kermes by acids, which the Perſians and Indians uſed.

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* Antiquit. Celt. p. 69, 70.

† Spaten (Stiler) der Teutſchen Sprache Stammbaum, 1691, 4to. p. 1062.

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* In his annotations on *Conſtantini Libri de ceremoniis aulæ Byzantinæ*, ii. p. 137, he ſays: Vocabulum ſcharal, quod coccineum colorem notat, in Golii Lexico non proſtat; habetur tamen in Moallacah quinta. Reiſke alſo on this occaſion gives the derivation from *Charlatan*, a mountebank, juggler, *circumforaneus, agyrta*, becauſe ſuch people formerly on account of their red clothes were called *ſcarlatati* or *ſcarlatani*. Other conjectures reſpecting this word may be found in *Dictionnaire étymologique*, par M. Menage, Paris 1750, fol. i. p. 354. See in the ſame work alſo, p. 498, the word *écarlate*. In ancient French writers the higheſt degree of any colour in its perfection is called *écarlate*, and we therefore meet with *écarlate blanche, écarlate verte*. *Braun de veſtitu ſacerd. Hebræor.* Amſtelod. 1701, 4to. lib. i. cap. 15. p. 229, ſays: *Salacka*, Tyrian red, from *ſar*, Tyrus. He controverts the opinion of Gronovius that *ſcarlatum* is derived from *Galaticum*.

† Travels through Spain, by John Talbot Dillon. London 1780, 4to. p. 21. Rod. Toletanus de rebus Hiſpan. lib. vii. 1.

‡ G. J. Voſſius de vitiis ſermonis. Amſtelodami 1645, 4to. p. 197, 276, 802, 810. Cæſarius, lib. ix. miracul. 18.

1134.

1134. But I find that the emperor Henry III, in the middle of the eleventh century, conferred upon the count of Cleves the burg-graviate of Nimeguen, on condition of his delivering to him yearly three pieces of ſcarlet cloth made of Engliſh wool *. The word may be often found in the twelfth century. It occurs in Petrus Mauritius †, who died in 1157, and alſo in the writings of Arnold, who, in 1175, was the firſt abbot of Lubeck.

Of the preparation and goodneſs of the ancient ſcarlet we certainly know nothing: but as we find in many old pieces of tapeſtry of the eleventh century, and perhaps earlier, a red which has continued remarkably beautiful even to the preſent time, it cannot at any rate be denied, that our anceſtors extolled their ſcarlet not without reaſon. We can however venture to aſſert, that the ſcarlet prepared at preſent is far ſuperior, owing princi-

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* Pontani Hiſtoria Gelrica, Herdervici 1639, fol. p. 83: Tres pannos ſcarlitinos Anglicanos. The year ſeems to have been 1050. In *Lunigs Codex diplom. Germaniæ*, ii. p. 1739, may be ſeen a document of the year 1172, in which the emperor Frederick I confers on the count of Gueldres the heritable juriſdiction of Nimeguen, on condition, *ut* ipſe et ejus ſucceſſores imperatori de eodem telonio ſingulis annis tres pannos ſcarlacos bene rubeos Anglicenſes ardentis coloris—aſſignare deberet.

† Petrus Mauritius, in Statutis Cluniacenſibus, cap. 18: Statutum eſt, ut nullus ſcarlatas, aut barracanos vel pretioſos burellos habeat.

pally to the effects of a ſolution of tin. This invention may be reckoned amongſt the moſt important improvements of the art of dyeing, and deſerves a particular relation.

The tincture of cochineal alone yields a purple colour, not very pleaſant, which may be heightened to the moſt beautiful ſcarlet by a ſolution of tin in aqua-regia *. Mr. Ruhlenkamp at Bremen, one of the moſt learned dyers of Germany, and who has ſtudied with great care every new improvement of his art, gave me the hiſtory of this ſcarlet-dye, as I have already related in my Introduction to Technology †. The well-known Cornelius Drebbel, who was born at Alkmaar, and died at London in 1634, having placed in his window an extract of cochineal, made with boiling water, for the purpoſe of filling a thermometer, ſome aqua-regia dropped into it from a phial, broken by accident, which ſtood above it, and converted the purple dye into a moſt beautiful dark red. After ſome conjectures and experiments, he diſcovered that the tin by which the window-frame was divided into ſquares had been diſſolved by the aqua-regia, and was the cauſe of this change. He communicated his obſervation

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* See Porner's Anleitung zur Farbekunſt. Leipzig 1785, 8vo. p. 16.

† Page 113.

to Kuffelar, that excellent dyer at Leyden, who was afterwards his ſon-in-law *. The latter brought the diſcovery to perfection, and employed it ſome years alone in his dye-houſe, which gave riſe to the name of Kuffelar's-colour †. Becher calls him Kuffler ‡. Kunkel, in a paſſage which I cannot again find, makes his name Kuſter, and ſays that he was a German. In the courſe of time the ſecret became known to an inhabitant of Menin, called Gulich, and alſo to another perſon of the name of Van der Vecht, who taught it to the brothers Gobelins in France. Giles Gobelin, a dyer at Paris, in the time of Francis I, had found out an improvement of the then uſual ſcarlet dye; and as he had remarked that the water of the rivulet Bievre, in the ſuburbs St. Marceau, was excellent for his art, he erected on it a large dye-houſe, which, out of ridicule, was called *Folie-Gobelins* ‖, Gobelin's-Folly. About this period, a Flemiſh painter, whom ſome name Peter Koek, and others Kloek, and who had travelled a long time in the Eaſt, eſtabliſhed, and continued to his death in 1550, a manufactory for dyeing ſcarlet cloth by an improved method[*]. Through the means of Colbert, one of the Gobelins learned the proceſs uſed for preparing the German ſcarlet-dye from one Gluck, whom ſome conſider as the above-mentioned Gulich, and others for Kloek; and the Pariſian ſcarlet-dye ſoon roſe into ſo great repute, that the populace imagined that Gobelin had acquired his art from the devil [†]. It is well known that Louis XIV, by the advice of Colbert, purchaſed Gobelin's building from his ſucceſſors in the year 1667, and transformed it into a palace, to which he gave the name of *Hôtel royal des Gobelins*, and which he aſſigned for the uſe of firſt-rate artiſts, particularly painters, jewellers, weavers of tapeſtry, and others. After that time the rivulet was no longer called Bievre, but Gobelins. About the year 1643, a Fleming, named Kepler, eſtabliſhed the firſt dye-houſe for ſcarlet in England, at the village of Bow, not far from London; and on that account the colour was called, at firſt, by the Engliſh, the *Bow-dye* [‡]. In the year 1667, another Fleming, named Brewer, invited to England by king Charles II, with the promiſe of a large ſalary, brought this art there to great perfection *. All theſe accounts, however, and the names of the perſons, are extremely dubious.

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* Monconys mentions in his Travels, p. 408, Dr. Keiffer, a ſon-in-law of Drebbel, who was a good chemiſt.

† In Borrichii Diſſertat. ii. p. 104: Color Kufflerianus.

‡ Närriſche Weiſheit, p. 71.

‖ Rabelais, xi. 22. Menage, Diction. étymol. i. p. 632.

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[*] Francheville, in Diſſertat. ſur l'art de la teinture des anciens et modernes, in Hiſtoire de l'académ. de Berlin, 1767, p. 67. In this diſſertation, however, there is neither certainty nor proof.

[†] Suite de teinturier parfait. Paris 1716.

[‡] Anderſon's Hiſtory of Commerce.

WRITING-PENS.

As long as people wrote upon tables covered with wax, they were obliged to uſe a ſtyle or bodkin made of bone, metal, or ſome other hard ſubſtance; but when they began to write with coloured liquids, they then employed a reed, and afterwards quills or feathers. This is well known, and has been proved by various authors †. There are two circumſtances however reſpecting this ſubject, which require ſome farther reſearch; and which I ſhall endeavour to illuſtrate by ſuch information as I have been able to collect. With what kind of

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* Cary's Bemerkungen über Groſsbritanniens handel; überſetzt von Wichmann. Leipzig 1788, i. p. 372. Boyle remarks in his *Experimenta de coloribus*, Coloniæ 1680, 4to, that a bright ſcarlet colour was never produced except when tin veſſels were uſed. It appears, therefore, that he had obſerved the good effects of a ſolution of tin.

† This may be found proved in *Fabricii Bibliotheca antiquaria*, p. 959, and in *Reimmanni Idea ſyſtematis antiquitatis litterariæ*, Hildeſheim 1718, 8vo. p. 169. Of modern writers, ſee the Origin and progreſs of writing as well hieroglyphic as elementary; by Thomas Aſtle. London 1784, 4to.

reeds did people write? When, and where did people begin to employ feathers for that purpoſe?

It is rather aſtoniſhing, that we are ignorant what kind of reeds the ancients uſed for writing, though they have mentioned the places where they grew wild, and where, it is highly probable, they grow ſtill. Beſides, we have reaſon to ſuppoſe, that the ſame reeds are uſed even at preſent by all the Oriental nations; for it is well known, that among the people of the Eaſt old manners and inſtruments are not eaſily baniſhed by new modes and new inventions. Moſt authors who have treated on the hiſtory of writing have contented themſelves with informing their readers that a reed was employed; but that genus of plants called by the ancients *calamus*, and *arundo*, is more numerous in ſpecies than the genus of graſſes, to which the corn of the ancients belongs; and it might perhaps be as difficult to determine what kind of reed they employed for writing, as to diſtinguiſh the ſpecies of grain called *far*, *alica* and *avena*.

The moſt beautiful reeds of this kind grew formerly in Egypt *; near Cnidus, a city and diſtrict in the province of Caria, in Aſia Minor †; and likewiſe in Armenia and Italy *. Thoſe which grew in the laſt-mentioned country, ſeem to have been conſidered by Pliny as too ſoft and ſpongy: but his words are ſo obſcure that little can be gathered from them; and though the above places have been explored in latter times by many experienced botaniſts, they have not ſupplied us with much certain information reſpecting this ſpecies of reed. It is however particularly mentioned by the old botaniſts, who have repreſented it as a ſtem, ſuch as I have ſeen in collections; but as they give no characteriſing marks ſufficiently preciſe, Linnæus was not able to aſſign any place in his ſyſtem to the *arundo ſcriptoria* of Bauhin †.

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* Plin. lib. xvi. cap. 35. Martial. lib. xiv. epigram. 38: Dat chartis habiles calamos Memphitica tellus.

† Plin. lib. c. Catullus, carm. xxxvi. 13, mentions Cnidus

Chardin ſpeaks of the reeds which grow in the marſhes of Perſia, and which are ſold and much ſought after in the Levant, particularly for writing. He has even deſcribed them; but his account has been of no ſervice to enlarge our botanical knowledge

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dus arundinoſa. Auſonius, epiſt. iv. 75, calls the reeds Cnidi nodi.

* Chartis ſerviunt calami; Ægyptii maxime, cognatione quadam papyri; probatiores tamen Gnidii, et qui in Aſia circa Anaiticum lacum naſcuntur. Noſtratibus fungoſior ſubeſt natura, cartilagine bibula, quæ cavo corpore intus, ſuperne tenui inareſcit ligno, fiſſilis præacuta ſemper acie, geniculata. *Plin.* lib. xvi. cap. 36.

† Bauhini Pinax plantar. p. 17: *Arundo ſcriptoria atro-rubens.* Hiſt. plant. ii. p. 487. Theatrum botan. p. 273.

ledge*. Tournefort, who ſaw them collected in the neighbourhood of Teflis, the capital of Georgia, though his deſcription of them is far from complete, has taught us more than any of his predeceſſors. We learn from his account, that this reed has ſmall leaves, that it riſes only to the height of a man, and that it is not hollow but filled with a ſoft ſpongy ſubſtance. He has characteriſed it, therefore, in the following mannér in his Syſtem of Botany: *Arundo orientalis, tenuifolia, caule pleno, ex qua Turcæ calamos parant* †. The ſame words are applied to it by Miller; but he obſerves that no plants of it had ever been introduced into England [*]. That the beſt writing-reeds are procured from the ſouthern provinces of Perſia is confirmed by Dapper [†] and Hanway [‡]. The former ſays, that the reeds are ſown and planted near the Perſian gulph in the place mentioned by Chardin, and gives the ſame deſcription as that traveller of the manner in which they are prepared.

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* Their writing-pens are made of reeds or ſmall hard canes of the ſize of the largeſt ſwan-quills, which they cut and ſlit in the ſame manner as we do ours; but they give them a much longer nib. Theſe canes or reeds are collected towards Daurac, along the Perſian gulph, in a large fen ſupplied with water by the river Hellé, a place of Arabia formed by an arm of the Tygris, and another of the Euphrates united. They are cut in March, and, when gathered, are tied up in bundles and laid for ſix months under a dunghill, where they harden and aſſume a beautiful poliſh and lively colour, which is a mixture of yellow and black. None of theſe reeds are collected in any other place. As they make the beſt writing-pens, they are tranſported throughout the whole Eaſt. Some of them grow in India, but they are ſofter and of a paler yellow colour. *Voyages de Chardin*, vol. v. p. 49.

† It is a kind of cane which grows no higher than a man. The ſtem is only three or four lines in thickneſs, and ſolid from one knot to another, that is to ſay filled with a white pith. The leaves, which are a foot and a half in length, and eight or nine lines in breadth, encloſe the knots of the ſtem in a ſheath; but the reſt is ſmooth, of a bright yellowiſh green colour, and bent

The circumſtance expreſsly mentioned by Tournefort, that theſe writing reeds are not entirely hollow, ſeems to agree perfectly with the account given by Dioſcorides [||]. It is probable that the pith

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bent in the form of a half tube, with a white bottom. The panicle or bunch of flowers was not as yet fully blown, but it was whitiſh, ſilky, and like that of other reeds. The inhabitants of the country cut the ſtems of theſe reeds to write with, but the ſtrokes they form are very coarſe, and do not approach the beauty of thoſe which we make with our pens. *Voyage du Levant*, vol. ii. p. 136.

[*] Tournefort, Inſtit. rei herb. in corollario, p. 39. Miller's Gardener's Dictionary.

[†] Beſchreibung von Aſia. Nurnberg 1681, fol. p. 142.

[‡] Reiſe, i. p. 233.

[||] Lib. i. cap. 114: Αλλος συριγγιας, πολυσαρκος, πυκνογονατος, εις βιβλιογραφιαν επιτηδειος. Alia ſyringias, hoc eſt fiſtuloſa, multa carne prædita, geniculis denſior, ad librorum ſcriptionem accommodata. Some read ολιγοσαρκος. Non eſt veriſimile, ſays Saracen, fuiſſe adeo πολυσαρκον, ſed vacuum potius et inanem fiſtularum modo.

pith dries and becomes ſhrunk, eſpecially after the preparation deſcribed by Chardin, ſo that the reed can be eaſily freed from it in the ſame manner as the marrowy ſubſtance in writing-quills is removed from them when clarified. Something of the like kind ſeems to be meant by Pliny, who, in my opinion, ſays that the pith dried up within the reed, which was hollow at the lower end, but at the upper end woody and deſtitute of pith. What follows refers to the flowers, which were employed inſtead of feathers for beds, and alſo for caulking ſhips *. I conjectured that Forſkal had given an accurate deſcription of this reed; but when I conſulted that author, I did not find what I expected. He only confirms that a great many reeds of different kinds grow near the Nile, which

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modo. Rauwolf ſays in his Travels, vol. i. p. 93: In the ſhops were to be ſold ſmall reeds, hollow within and ſmooth without, and of a browniſh red colour, which are uſed by the Turks, Moors, and other Eaſtern people, for writing. It appears that Rauwolf did not ſee theſe reeds growing, but prepared and freed from the pith. We are told by Winkelmann, in his ſecond Letter on the Antiquities of Herculaneum, p. 46, that for want of quills he often cut into writing-pens thoſe reeds which grow in the neighbourhood of Naples.

* Cætero gracilitas nodis diſtincta, leni faſtigio tenuatur in cacumina, craſſiore paniculæ coma; neque hac ſupervacua; aut enim pro pluma ſtrata cauponarum replet; aut, ubi limoſiore callo induruit, ſicut in Belgis, contuſa et interjecta navium commiſſuris ferruminat textus, glutino tenacior, rimiſque explendis fidelior pice.

ſerve

ſerve to make hedges, thatch, and wattled-walls, and which are uſed for various other purpoſes [*].

Theſe reeds were ſplit, and formed to a point like our quills [†]; but certainly it was not poſſible to make ſo clean and fine ſtrokes, and to write ſo long [‡] and ſo conveniently with them as one can with quills. The uſe of them, however, was not entirely abandoned when people began to write with quills, which in every country can be procured from an animal extremely uſeful in many other reſpects. Had the ancients been acquainted with the art of employing gooſe-quills for this purpoſe, they would undoubtedly have dedicated to Minerva not the owl but the gooſe.

A paſſage in Clemens of Alexandria, who died in the beginning of the third century, might on the firſt view induce one to conjecture that the

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[*] Flora Ægyptiaco-Arabica. Havniæ 1775, 4to. p. 47, 61.

[†] On this account they are called, in ſome old epigrams, καλαμοι μεσοσχιδεις, μεσοτομοι, διαγλυπτοι; and, in Auſonius, *calami fiſſipedes*. See Winkelmann, Erſtes Sendſchreiben, p. 85.

[‡] Thoſe who wiſh to ſee inſtances of learned men who wrote a great deal and a long time with one pen, may conſult *J. H. Ackeri Hiſtoria pennarum*, Altenburgi 1726, four ſheets in octavo. The author has collected every thing he ever read reſpecting the pens of celebrated men. This work, of which I found an account in Fabricius's *Bibliotheca Antiq.* I ſhould not have mentioned, had I not imagined that the title might induce people to believe that it contains the hiſtory of writing-quills.

Egyptian prieſts even wrote with quills. This author, after deſcribing a proceſſion of theſe prieſts, ſays, The ſacred writer had in his hand a book with writing inſtruments, and on his head feathers [*]. But it is impoſſible to gueſs what might be the intention of theſe feathers or wings on the head, among a people who were ſo fond of ſymbols. Beſides, Clemens tells us expreſsly, that one of the writing-inſtruments was a reed with which the prieſts uſed to write.

Some aſſert from a paſſage of Juvenal [†], that quills were uſed for writing in the time of that poet; but what he ſays is only a metaphorical expreſſion, ſuch as has been employed by Horace [‡] and various ancient writers. Others have endeavoured to prove the antiquity of writing-quills from the figure of the goddeſs Egeria, who is repreſented with a book before her, and a feather in her right hand; but the period when this Egeria was formed is not known, and it is probable that the feather was added by ſome modern artiſt *. No drawings in manuſcripts, where the authors appear with quills, are of great antiquity. Among theſe is the portrait of Ariſtotle, in a manuſcript in the library of Vienna, which, as expreſsly mentioned at the end, was drawn at Rome in the year 1457; and we have great reaſon to think that the artiſt delineated the figure for ornamenting his work, not after an ancient painting, but from his own imagination †.

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[*] Deinceps ιερογραμματευς, id eſt, ſcriba ſacrorum, pennas habens in capite (εχων πτερα επι της κεφαλης) et librum in manibus, ac regulam, in qua eſt et atramentum ad ſcribendum, et juncus, quo ſcribunt (σχοινος η γραφουσι), progreditur. *Clementis Alex. Opera.* Coloniæ 1688, fol. p. 633. The beſt account of theſe ſacred writers may be found in the *Prolegomena*, p. 91, of *Jablonſki's Pantheon Egypt.*

[†] — — tanquam et diverſis partibus orbis
Anxia præcipiti veniſſet epiſtolâ penna.
JUVENAL. ſat. iv. 149.

[‡] — — — — Si celeres quatit
Pennas, reſigno quæ dedit.
HORAT. od. iii. 29, 53.

If we can give credit to the anonymous author of the hiſtory of Conſtantius, extracts from which have been made known by Adrian de Valois, the uſe of quills for writing is as old as the fifth century. We are informed by this author, who lived in the above century, that Theodoric, king of the Oſtrogoths, was ſo illiterate and ſtupid, that during the ten years of his reign he was not able to learn to write four letters at the bottom of his edicts. For this reaſon the four letters were cut for him in a plate of gold, and the plate being laid upon paper,

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* Gronovii Theſaurus antiq. Græc. ii. n. 28. Dulodori (Laur. Bergeri) Colloquium de tribus Antiquitatum Græc. voluminibus. Berolini 1702, fol. p. 14.

† Lambec. lib. vii. p. 76. Montfaucon, Palæograph. Græca, Paris 1708, lib. i. cap. 3. p. 21.

paper, he then traced out the letters with a quill *. This account is, at any rate, not improbable; for hiſtory ſupplies us with more inſtances of ſuch men not deſtined for the throne by nature, but raiſed to it either by hereditary right or by accident, who had neither abilities nor inclination for thoſe ſtudies which it requires. The weſtern empire was governed, almoſt about the time of Theodoric, by the emperor Juſtin, who alſo could not write, and who uſed in the like manner a piece of wood, having letters cut in it, but with this difference, that, in tracing them out, he cauſed his hand to be guided by one of his ſecretaries †.

The

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* Rex Theodoricus inliteratus erat et ſic bruto ſenſu, ut in decem annos regni ſui quatuor literas ſubſcriptionis edicti ſui diſcere nullatenus potuiſſet. De qua re laminam auream juſſit interraſilem fieri, quatuor literas regis habentem, Theod. ut, ſi ſubſcribere voluiſſet, poſita lamina ſuper chartam, per eam penna duceret, et ſubſcriptio ejus tantum videretur. *Excerpta auctoris ignoti de Conſtantio et aliis impp.* added to *Ammiani Marcellini Hiſt.* ed. Valeſii. Pariſiis 1681, fol. p. 699. I have in my poſſeſſion *Miſcella antiquæ lectionis*, Simonis Paulli, *bibliopol. Argentin. impenſis*. Argentorati 1670, 8vo. in which the whole paſſage is printed, p. 33, with annotations of Valois. A friend with whom I converſed on this ſubject ſeemed to think that the letters might be raiſed on the plate, or deeply engraven in it, ſo that Theodoric only followed with his pen an impreſſion of them made upon the paper. The word *interraſilis* has indeed been uſed at later periods for *anaglyphis*, to ſignify raiſed work, carved work or *bas-relief*; but the words *per eam penna duceret* make, I think, my opinion more probable. At any rate Pliny, b. xii. c. 19, uſes *interraſilis* for work cut through. See *Geſner's Stephanus*.

† Ut aliquod imperatoris manus extaret argumentum, a ma-

The oldeſt certain account however known at preſent reſpecting writing-quills, is a paſſage of Iſidore, who died in the year 636, and who, among the inſtruments employed for writing, mentions reeds and feathers *. Another proof of quills being uſed in the ſame century, is a ſmall poem on a writing-pen, to be found in the works of Althelmus, called ſometimes alſo Aldhelmus, Adelhemus, and Adelmus. This writer, deſcended of a noble family, was the firſt Saxon who wrote Latin, and who made the art of Latin poetry known to his countrymen, and inſpired them with

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giſtratu, qui id muneris habet, excogitatum eſt hoc. Tabellæ ligneæ perpolitæ formam quatuor literarum, quæ legi Latine poſſent, incidendum curant (εγκολαψαντες), eaque libello impoſita, calamus colore imbutus (γραφιδα βαφῃ βαψαντες) quo ſcribere mos eſt imperatoribus, huic principi tradebatur in manum, quam alii prehenſantes ducebant, circumagebantque calamum (γραφιδα) per quatuor illas literarum formas, nempe ſingulas tabellæ inciſuras (εντομας), atque ita demum iis ab imperatore literis reportatis recedebant.—From this paſſage however, we cannot learn whether the characters were followed with a ſtyle, a reed, or a quill; for γραφις is the general appellation. - - - There have been princes, alſo, acquainted with writing, but ſo lazy that they kept a ſervant who could imitate their hand to ſubſcribe for them. Of this we have an inſtance in the emperor Carinus, reſpecting whom Vopiſcus ſays: Faſtidium ſubſcribendi tantum habuit, ut quendam ad ſubſcribendum poneret qui bene ſuam imitaretur manum.

* Inſtrumenta ſcribæ calamus et penna. Ex his enim verba paginis infiguntur; ſed calamus arboris eſt, penna avis, cujus acumen dividitur in duo; in toto corpore unitate ſervata. *Origines*, lib. vi. 13. p. 132.

a taſte for compoſitions of that kind. He died in the year 709 *.

In the eighth century writing-pens are mentioned by Alcuin, who at that period, in the time of Charlemagne, was of ſervice in extending literary knowledge. He compoſed poetical inſcriptions for every part of a monaſtery, among which there is one even for a privy †, and another for a writing ſtudy. Speaking of the latter, he ſays that no one ought to talk in it, leſt the pen of the tranſcriber ſhould commit a miſtake ‡.

After

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* His writings may be found in *Maxima Bibliotheca patrum.* Lugduni 1677, fol. tom. xiii. In p. 27, is the following poem on a pen:

De penna ſcriptoria.

Me pridem genuit candens onocrotalus albam
Gutture qui patulo ſorbet in gurgite lymphas.
Pergo ad albentes directo tramite campos,
Candentique viæ veſtigia cærula linquo,
Lucida nigratis fuſcans anfractibus arva.
Nec ſatis eſt unum per campos pandere callem;
Semita quin potius milleno tramite tendit,
Quæ non errantes ad cœli culmina vexit.

The author does not ſpeak here of a gooſe-quill, but of a pelican's, which at any rate may be as good as that of a ſwan.

† Ad latrinium (latrinam).

‡ In the lateſt elegant edition, *Alcuini opera, cura* Frobenii, Ratiſbonæ 1777, 2 vol. fol. ii. p. 211,

Ad muſeum libros ſcribentium.

Hic ſedeant ſacræ ſcribentes famina legis
Nec non ſanctorum dicta ſacrata patrum.

Hæc

Aſter the above period proofs occur which place the matter beyond all doubt. Mabillon ſaw a manuſcript of the goſpels, which had been written in the ninth century under the reign of St. Louis, in which the evangeliſts were repreſented with quills in their hands. The ſame author mentions a like figure of the eleventh century [*]. In the twelfth century, Peter de Clugny, who by ſcholaſtic writers is called *Venerabilis*, and who died in 1157, wrote to a friend, exhorting him to aſſume

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Hæc interſerere caveant ſua frivola verbis,
  Frivola nec propter erret, et ipſa manus ;
Correctoſque ſibi quærant ſtudioſe libellos,
  Tramite quo recto penna volantis eat.
Per cola diſtinguant proprios et commata ſenſus,
  Et punctos ponant ordine quoſque ſuo ;
Ne vel falſa legat, taceat vel forte repente,
  Ante pios fratres, lector in eccleſia.

[*] Extat in Altivillarenſi agri Remenſis monaſterio veterrimus Evangeliorum codex, quem Petrus abbas ab annis fere nongentis, ſcilicet principatu Ludovici Pii, pontificatu Ebonis archiepiſcopi, a Placido monacho litteris aureis eleganter exarari curavit ; quo in codice depicti exhibentur quatuor Evangeliſtæ ſcribentium in morem, cum penna in manu, in quibuſdam ex illis quatuor ſic expreſſa, ut de pennæ uſu in ſcribendo illis temporibus recepto non liceat dubitare. Vidimus et alium codicem Vitæ Sancti Amandi in Abbatia Elnonenſi, ante annos circiter ſeptingentos deſcriptum, in quo Bandemundus monachus, qui hanc Vitam ab annis mille compoſuit, cum penna itidem in manu repræſentatur. Similia alibi exempla videre licet. *De re diplomatica*, Lutetiæ Pariſiorum 1709, fol. in ſupplemento, p. 51.

the pen inſtead of the plough, and to tranſcribe, inſtead of tilling land *. In ſhort, writing-quills are often called *calami* by ancient and modern authors who wrote good Latin; and it is probable that this word is employed by older writers than Iſidore to ſignify writing-pens, where, for want of other proofs, we underſtand reeds.

The poet Heerkens † has lately aſſerted, that the uſe of quills for writing is much older, and that the Romans became acquainted with them during their reſidence in the Netherlands, where they could not eaſily procure Egyptian reeds, and where, according to the account of Pliny ‡, they paid ſo much attention to the catching of geeſe. That writer, however, ſays, that this was done on account of the fleſh of theſe animals, which they eſteemed much when roaſted, and of the ſoftneſs of their feathers on which they were fond of ſleeping. Heerkens himſelf remarks, that Pliny, had he known the uſe of quills for writing, would not have paſſed it over in ſilence, when he gives ſo circumſtantial an account of writing-reeds. He is of opinion alſo, that, as the Dutch terms of art which allude to writing, ſuch as *ſchryſpen,* &c. are of Latin extraction, the Dutch muſt have acquired them as well as the things ſignified from the Romans. This however ſeems to afford very little ſupport to his aſſertion. Of more importance is the obſervation that in an old and beautiful manuſcript of Virgil, in the Medicean library, which was written ſoon after the time of Honorius, the thickneſs of the ſtrokes, and the gradual fineneſs of the hair-ſtrokes, of the letters give us reaſon to conjecture, that they muſt have been written by ſome inſtrument equally elaſtic as a quill, as it is not probable that ſuch ſtrokes could be made with a ſtiff reed *. It is alſo certain, that the letters of the greater part of ancient manuſcripts, particularly thoſe found at Herculaneum, are written in a much ſtiffer and more uniform manner. But little confidence is to be placed in this obſervation; for we do not know but the ancient artiſts may have been acquainted with ſome method of giving elaſticity to their reeds, and may have employed them in ſuch a manner as to produce beautiful writing.

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* Pro aratro convertatur manus ad pennam; pro exarandis agris, divinis literis paginæ exarentur. *Petr. Venerabil.* lib. i. ep. 20, ad *Giſlebertum.* C. G. Schwarz, who quotes theſe words in *Exercit. de varia ſuppellectile rei librariæ veterum,* Altorfii 1725, 4to, § 8, aſcribes them falſely to the venerable Bede, who died about the year 735.

† Ger. Nic. Heerkens Aves Friſicæ. Rotterodami 1788, 8vo. p. 106.

‡ Hiſt. Nat. lib. x. cap. 22.

Notwithſtanding the great advantage which quills have over reeds for writing, the latter however ſeem to have continued long in uſe even with the former. This concluſion I do not form becauſe *calamus* and *arundo* are to be found in the works of late writers; for many authors may have employed theſe old Latin words to expreſs quills, like Caſſiodorus, who in the ſixth century, when exhorting the monks to tranſcribe theological works, uſed both theſe terms indiſcriminately *: but I found my aſſertion on the teſtimony of diplomatiſts, and particularly on the undoubted mention made of writing-reeds in the ſixteenth century.

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* This manuſcript was correctly printed by Pet. Franc. Fogginius, in quarto, in 1741. A ſpecimen of the writing is given p. 15. See the neweſt edition of Virgil by Mr. Heyne, in *Elenchus codicum*, p. 41.

Men of letters, well verſed in diplomatics, aſſure us, from comparing manuſcripts, that writing-reeds were uſed along with quills in the eighth century, at leaſt in France, and that the latter firſt began to be common in the ninth. The papal acts, and thoſe of ſynods, muſt however have been written with reeds much later †. In convents they were retained for text and initials, while, for ſmall writing, quills were every where employed ‡.

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* Divin. lection. cap. xxx. p. m. 477, 478.

† Nouveau traité de diplomatique, par deux Benedictins. Paris 1750, 4to. vol. i. p. 537.

‡ Brower in his notes to *Hrabani Mauri Poemata*, Moguntiæ 1617, 4to. p. 122: Utriuſque, et calami et pennæ, in monaſteriis ad rituales libros et cantum eccleſiaſticum celebrem uſum viguiſſe, recordantur avi noſtri.

I can allow little credit to a conjecture ſupported merely by a ſimilarity of the ſtrokes in writing, becauſe it is probable that people at firſt would endeavour to write in as ſtrong and coarſe a manner with quills, as had been before done with reeds, in order that the writing might not ſeem much different from what was uſual; and with quills one can produce writing both coarſe and fine. Mr. Meiners, however, referred me to a paſſage in a letter of Reuchlin, which removes all doubt on the ſubject. When this worthy man, to whom poſterity are ſo much indebted, was obliged to fly by the cruelty of his enemies, famine and the plague, and to leave behind him all his property, he was ſupplied with the moſt common neceſſaries by Pirkheimer[*]. Among other articles the latter ſent to him, in the year 1520, writing materials, good paper, pen-knives, and, inſtead of peacocks-feathers which he had requeſted, the beſt ſwan-quills. That nothing might be wanting, he added alſo proper reeds, of ſo excellent a ſort, that Reuchlin conſidered them to be Egyptian or Cnidian[†].

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[*] Reuchlin's life may be found in Meiners' Lebensbeſchreibungen berühmter männer. Zurich 1795, 8vo. vol. 1.

[†] Deſideravi pavonum pennas, ut quandoque lecta deſcriberem; tu me olorinis donaſti plus quam egregiis: ac ne deeſſes officioſæ amicitiæ, calamos etiam Niloticos, vel, quod potius reor, Cnidios

Theſe reeds at that period muſt have been ſcarce and in great requeſt, as it appears by ſome letters of Eraſmus to Reuchlin, for my knowledge of which I am under obligations to Mr. Meiners, that the former received three reeds from the latter, and expreſſed a wiſh that Reuchlin, when he procured more, would ſend ſome of them to a learned man in England, who was a common friend to both *.

Whatever may have been the cauſe, about the year 1433 writing-quills were ſo ſcarce at Venice, that it was with great difficulty men of letters could procure them. We learn at any rate, that the well-known Ambroſius Traverſarius, a monk of Camaldule, ſent from Venice to his brother, in the above year, a bunch of quills, together with a letter, in which he ſaid, "They are not the beſt, but " ſuch as I received in a preſent. Shew the whole " bunch to our friend Nicholas, that he may ſelect " a quill; for theſe articles are indeed ſcarcer in this

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dios ad ſcribendum aptiores miſiſti; et gladiolos inciſioni commodiſſimos. *Bilibaldi Pirkheimeri Opera*, Francof. 1610. fol. p. 259.

[*] Senſi illum avidiſſimum calamorum νειλωτων cujuſmodi mihi tres donaſti; proinde, ſi tibi ſunt aliquot, nullum munus gratius mittere poſſis. *Illuſtrium virorum epiſtolæ ad Joannem Reuchlin miſſæ.* The following words ſtand at the end: Hagenoæ 1519, 4to. p. 144. The letter from which this extract is taken has no date.

" city than at Florence *." This Ambroſius complains likewiſe, that at the ſame period he had hardly any more ink, and requeſted that a ſmall veſſel filled with it might be ſent to him †. Other learned men complain alſo of the want of good ink, which they either would not or did not know how to make. Thoſe even who deal in it ſeldom know of what ingredients it is principally compoſed.

WIRE-DRAWING.

IT is highly probable, that in early periods metals were beat with a hammer to thin plates or leaves, which were afterwards divided into ſmall ſlips by means of a pair of ſciſſars, or ſome other inſtrument; and that theſe ſlips were by a hammer and file then rounded, ſo as to form threads or wire.

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* Mitto ad te calamorum faſciculum, non quidem optimorum, ſed quales mihi dono dati ſunt. Nicolao noſtro dabis ſeligendos, ut ſi quem ex eis elegerit, ſatisfeciſſe officio noſtro vel ex parte videamur. Nam revera majorem in hac civitate hujuſce rerum penuriam quam Florentiæ patimur. *Ambroſii Traverſarii Epiſtolæ*, ed. L. Mehus. Florentiæ 1759, 2 vol. fol. ii. p. 566. In my opinion this complaint alludes only to the particular place where the author was. See the life of Ambroſius, in Meiners' *Lebensbeſchreibungen berühmter männer*, ii. p. 306.

† Ibid. p. 580.

This conjecture ſeems to be confirmed by the oldeſt information reſpecting work of this kind. When the ſacerdotal dreſs of Aaron was prepared, the gold was beaten and cut to threads, ſo that it could be interwoven in cloth *. We are told alſo, that Vulcan, deſirous to expoſe Mars and Venus, while engaged in their illicit amour, repaired to his forge, and formed on his anvil, with hammers and files, a net ſo fine that it could be perceived by no one, not even by the gods themſelves, for it was as delicate as a ſpider's web †. Theſe fine threads

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* Exodus, chap. xxxix. v. 3. Braun, in his work *De veſtitu ſacerdotum Hebræorum*, Amſtelod. 1701, p. 173, ſays: Jarchius has tranſlated theſe words as follows: Extendebant aurum inſtar bractearum tenuium, et ex iis ſcindebant filamenta, et nebant filamentum aureum cum byſſino.

† Βη ῥ' ιμεν ες χαλκεωνα, κακα φρεσι βυσσοδομευων·
Εν δ' εθετ' ακμοθετῳ μεγαν ακμονα, κοπτε δε δεσμους
Αῤῥηκτους, αλυτους, οφρ' εμπεδον αυθι μενοιεν.
Perrexit ire in officinam, mala animo profunde cogitans;
Impoſuit autem incudis repoſitorio ingentem incudem,
cudebatque vincula
Infrangibilia, inſolubilia; ut firmiter illic manerent.

Αμφι δ' αρ' ἑρμισιν χεε δεσματα κυκλῳ απαντη·
Πολλα δε και καθυπερθε μελαθροφιν εξεκεχυντο,
Ηυτ' αραχνια λεπτα, τα κ' ου κε τις ουδε ιδοιτο
Ουδε θεων μακαρων; περι γαρ δολοεντα τετυκτο.
Circumfudit autem lecti fulcris vincula circulatim omni ex
parte;
Multa autem et deſuper e faſtigio effuſa erant,

threads therefore were at that time firſt beat upon the anvil, and afterwards rounded by a file, but were not drawn out like our wire. I do not remember to have found a ſingle paſſage in ancient authors where mention is made of metal prepared by being wire-drawn. The *æs ductile* of Pliny was ſo called becauſe it was malleable, and could be beat into thin leaves; and he ſays *tenuatur in laminas**. In my opinion, works made with threads of metal occur too ſeldom in the writings of the ancients, to allow us to ſuppoſe that they were acquainted with that eaſy and cheap method of forming theſe threads by wire-drawing. Wire-work is rarely mentioned, and wherever it is ſpoken of, it appears to have been prepared on the anvil.

Perinde atque araneæ fila tenuia, quæ nemo ne cerneret quidem
Neque deorum beatorum; perquam enim doloſa facta erant.
Homer. Odyſſ. lib. viii. 273, 278.

— — — — — — At illi
Et mens, et quod opus fabrilis dextra tenebat,
Excidit. Extemplo graciles ex ære catenas
Retiaque et laqueos, quæ lumina fallere poſſint,
Elimat. Non illud opus tenuiſſima vincant
Stamina, non ſummo quæ pendet aranea tigno.
Utque leves tactus, momentaque parva ſequantur,
Efficit; et lecto circumdata collocat apte.
Ovid. Metamorph. lib. iv. 174.

I had much rather Burmann had conſidered a little more, and not changed *elimat* into *eliquat*.

* Lib. xxxiv. cap. 8.

Such threads of the deareſt and moſt malleable metal, gold, ſeem to have been early employed for ornamenting different articles of dreſs, but certainly not in ſo ingenious and beautiful a manner as in modern times. It is probable that ſlips of gold were ſewed upon clothes, and particularly on the ſeams, as is ſtill practiſed with lace; and perhaps gold ſtars and other figures cut from thin plates of gold were applied to dreſſes in the ſame manner, as is the caſe at preſent with ſpangles, and perhaps they were only affixed to them with paſte. People however ſoon began to weave or knit dreſſes entirely of gold threads, without the addition of any other materials; at leaſt ſuch ſeems to be the account given by Pliny *. Of this kind was the mantle taken from the ſtatue of Jupiter by that libertine Dionyſius †, and the tunic of Heliogabalus mentioned by Lampridius ‡. Theſe conſiſted of real *drap d'or*, but the moderns give that name to cloth the threads of which are ſilk wound round with flatted ſilver wire which has been gilded.

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* Lib. xxxiii. cap. 4: Vidimus Agrippinam indutam paludamento, aureo textili ſine alia materie.—Aldrovandus relates, in his *Muſeum metallicum*, that the grave of the wife of the emperor Honorius was diſcovered at Rome about the year 1544, and that thirty-ſix pounds of gold were procured from the mouldered dreſs which contained the body.

† Cicero de nat. deor. iii. 34, 83. Valer. Max. i. 1. exter. § 3: Detracto Jovi magni ponderis aureo amiculo - - - injectoque ei laneo pallio; dixit, æſtate grave amiculum eſſe, hieme frigidum; laneum autem ad utrumque tempus anni aptius.

‡ Lamprid. Vita Heliogab. cap. 23: Uſus eſt aurea omni tunica. *A tunic entirely of gold.*

The invention of interweaving ſuch maſſy gold threads in cloth is by Pliny aſcribed to king Attalus: but I conſider it to be much older, though I have found no certain proofs to ſupport this opinion. I conjecture that the cloth of Attalus, ſo much extolled on account of its magnificence, was embroidered with the needle; for in the paſſage where embroidery is mentioned by Pliny for the firſt time, he ſpeaks of its being invented by the Phrygians; he then mentions the cloth of Attalus; and immediately after the Babylonian, which, as is proved by ſeveral expreſſions in ancient authors, was certainly embroidered with the needle*. If I am not miſtaken, Attalus firſt cauſed

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* Acu facere id Phryges invenerunt, ideoque Phrygioniæ appellatæ ſunt. Aurum intexere in eadem Aſia invenit Attalus rex; unde nomen Attalicis. Colores diverſos picturæ intexere Babylon maxime celebravit. *Plin.* lib. viii. cap. 48. That the cloth of Attalus was embroidered with the needle is proved by a paſſage of *Silius Italicus*, lib. xiv. 661:

> - - - - - - Quæque Attalicis variata per artem
> Aulæis ſcribuntur acu.———

We find by Martial, lib. xiii. ep. 28, that the Babylonian cloth was alſo ornamented with embroidery:

> Non ego prætulerim Babylonica picta ſuperbe
> Texta, Semiramia quæ variantur acu.

The ſame author, lib. xiv. ep. 50, extols the weaving of Alexandria, cauſed woollen cloth to be embroidered (not interwoven) with threads of gold; and the doubt that Pliny aſſigns too late a period to the interweaving cloth with threads of gold is entirely removed. It appears that in the third century gold was interwoven with linen, that linen was embroidered with gold threads, or that gold threads were ſewed upon linen, which the emperor Alexander Severus conſidered as folly; becauſe by theſe means the linen was rendered ſtiff, cumberſome, and inconvenient[*].

It was not till a much later period that ſilver began to be formed into threads by a like proceſs, and to be interwoven in cloth. Saumaiſe and Goguet[†] have already remarked that no mention

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andria, as being not inferior to the Babylonian embroidery with the needle.

Hæc tibi Memphitis tellus dat munera; victa eſt
Pectine Niliaco jam Babylonis acus.

In oppoſition to the above might be quoted only one paſſage of Tertullian *De habitu mulierum*, where he makes uſe of the word *inſuere* to the Phrygian work, and of *intexere* to the Babylonian. By theſe expreſſions it would appear that he wiſhed to define accurately the difference of the Phrygian and Babylonian cloth, and to ſhew that the former was embroidered and the latter wove. But Tertullian often plays with words. *Intexere* is the ſame as *inſuere*. In Pliny, book xxxv. ch. 9, a name embroidered with gold threads is called *aureis litteris in palleis intextum nomen*.

[*] In linea aurum mitti dementiam judicabat, cum aſperitati adderetur rigor. *Lamprid. Vita Alexand. Severi*, c. 40.

[†] Vom Urſprunge der Geſetze und Künſte, ii. p. 99.

of ſilver ſtuffs is to be found in the works of the ancients; for the paſſages which might be quoted from Homer ſpeak only, without doubt, of white garments [*]. Pliny certainly would not have omitted this manner of preparing ſilver, had it been uſual in his time; eſpecially as he treats ſo expreſsly of that metal, and its being employed for ornaments, and ſpeaks of gold threads and embroidering with gold. Vopiſcus, however, ſeems to afford us an indubitable proof that ſilver thread was not known in the time of the emperor Aurelian [†]. This author informs us that the emperor was deſirous of entirely aboliſhing the uſe of gold for gilding and weaving, becauſe, though there was more gold than ſilver, the former had become ſcarcer, as a great deal of it was loſt by being applied to the above purpoſes, whereas every thing that was ſilver continued ſo [‡]; but it has been fully proved by Saumaiſe that ſilver threads were interwoven in cloth in the time of the laſt Greek emperors [*].

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[*] Odyſſ. lib. v. 230. x. 23, 24.

[†] Habuit in animo ut aurum neque in cameras, neque in tunicas, neque in pelles, neque in argentum mitteretur, dicens plus auri eſſe in rerum natura quam argenti; ſed aurum per varios bracteарum, filorum et liquationum uſus perire, argentum autem in ſuo uſu manere. *Vita Aureliani*, cap. 46.

[‡] To ſpeak the truth, a doubt ariſes reſpecting this proof. It is poſſible that the author here ſpeaks of gilt ſilver; for, as the ancients were not acquainted with the art of ſeparating theſe metals, their gold was entirely loſt when they melted the ſilver. I remember no paſſage, however, in ancient authors where mention is made of weaving or embroidering with threads of ſilver gilt.

The period when attempts were firſt made to draw into threads metal cut or beat into ſmall ſlips, by forcing them through holes in a ſteel plate placed perpendicularly on a table, I cannot determine. In the time of Charlemagne this proceſs was not known in Italy; for however unintelligible may be the directions given in Muratori [†] *de fila aurea facere, de petalis auri et argenti*, we learn from them that theſe articles were formed only by the hammer. It is extremely probable that the firſt experiments in wire-drawing were made upon the moſt ductile metals; and that the drawing of braſs and iron to wire is of later date. It is likewiſe certain that the metal was at firſt drawn by the hand of the workman; in the ſame manner as wire is drawn by our pin-makers when they are deſirous of rendering it finer. They wind it off from one cylinder upon another, by which means it is forced through the holes of the drawing iron; and this proceſs agrees perfectly with the deſcription of Vannuccio [‡] and Garzoni [‖], as well as with the figures in the German tranſlation of the latter.

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[*] Salmaſ. ad Vopiſc. p. 394; et ad Tertull. de pallio, p. 208. Such cloth, at thoſe periods, was called συρματινον, συρματηρον, drap d'argent.

[†] Antiquitat. Ital. medii ævi, ii. p. 374.

[‡] Pyrotechnia, lib. ix. cap. 8.

[‖] La piazza univerſale. In Venetia 1610, 4to. p. 390.

As long as the work was performed by the hammer, the artiſts at Nuremberg were called wire-ſmiths; but after the invention of the drawing-iron they were called wire-drawers, and wire-millers. Both theſe appellations occur in the hiſtory of Augſburg ſo early as the year 1351 *; and in that of Nuremberg in 1360 †; ſo that, according to the beſt information I have been able to obtain, I muſt claſs the invention of the drawing-iron, or proper wire-drawing, among thoſe of the fourteenth century.

At firſt, threads exceedingly maſſy were employed for weaving and embroidering. Among the ruins of Herculaneum were found maſſy gold taſſels, the threads of which were wound neither round ſilk nor any other materials ‡. It would be of ſome importance if one could determine the period when flatted metal wire began to be ſpun round linen or ſilk thread, by which improvement various articles of dreſs and ornament are rendered

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* Von Stetten, in Kunſtgeſchichte der ſtadt Augſburg, i. p. 223.

† Von Murr, in Journal zur Kunſtgeſchichte, v. p. 78. To this author we are indebted for much important information reſpecting the preſent ſubject.

‡ Bjornſtahls Briefe, i. p. 269.

more beautiful as well as cheaper. The ſpinning-mill, by which this labour is performed at preſent, is ſo ingeniouſly contrived that the name of the inventor deſerves to be made immortal *.

It appears that the wire firſt ſpun about thread was round; and the invention of previouſly making the wire flat is, in my opinion, a new epoch in the hiſtory of this art. Three times as much ſilk can be covered by flatted as by round wire; ſo that taſſels and other articles become cheap in proportion. Beſides, the brightneſs of the metal is heightened in an uncommon degree; and the article becomes much more beautiful †. The wire is flatted at preſent by means of a flatting-mill, which conſiſts of two ſteel cylinders, put in motion by a handle, and as the wire paſſes through between them it is compreſſed and rendered flat. The management of theſe cylinders requires a dexterity which only a few artiſts poſſeſs; and this ſeems to ſhew that the machine is ſtill in its infancy. Theſe cylinders were at firſt procured from the Milaneſe, and afterwards from Schwarzenbruck in Saxony; but ſince the death of the artiſts in thoſe parts who were acquainted with the

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* See a deſcription of it in *Sprengels Handwerken und künſten*, iii. p. 64; or in the tenth volume of the plates belonging to the *Encyclopédie*, under the article *Tireur et fileur d'or*.

† Bericht von gold- und ſilber-dratziehen; von Lejiſugo. Lubeck 1744, 8vo. p. 199.

the ſecret of making them, they have generally been ordered from Neufchatel. A pair of them coſt two hundred dollars. The whole art, however, ſeems to conſiſt in giving a proper hardneſs to the ſteel and in poliſhing them. In the earlieſt ages, wire was flatted with a hammer on the anvil; and the broad ſlips were cut into ſmall threads by women with a pair of ſciſſars. The proceſs is thus deſcribed by Vannuccio and Garzoni, without mentioning the flatting-mill which is now uſed for braſs work, coining money, and various other purpoſes.

Before I proceed to the neweſt inventions I ſhall add the following obſervations. Of the wire-work of the ancients we have very few remains, and theſe are to be found upon caſt ſtatues, on which one cannot expect any fine wire ſpun or entwiſted round other ſubſtances, even ſuppoſing that they had ſuch. In the muſeum at Portici, which contains a variety of articles diſcovered at Herculaneum, there are three metal heads, with locks in imitation of hair. One of them has fifty locks made of wire as thick as a quill, bent into the form of a curl. On the other the locks are flat like ſmall ſlips of paper which have been rolled together with the fingers, and afterwards diſentangled *. A Venus, a ſpan in height, has

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* J. Winkelmann, Sendſchreiben von den Herculaniſchen entdeckungen. Dreſden 1762, 4to. p. 36.

on the arms and legs golden bracelets* (*armillæ et periſcelides*), which are formed of wire twiſted round them. Grignon found in the ruins of a Roman city in Champagne a piece of gold thread which was a line in thickneſs †. Among the inſignia of the German empire is the ſword of St. Maurice, the handle of which is wood bound round with ſtrong ſilver wire ‡. The ancients, however, muſt have been acquainted at an early period with the art of making gold wire of conſiderable fineneſs, as they uſed it in weaving, and for embroidery. When ſurgeons were deſirous to faſten a looſe tooth, or to implant one of ivory in the room of one that had dropped out, they bound it to the next one by a piece of fine gold wire ‖.

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* Winkelmann, ibid. p. 38.

† Second bulletin des fouilles d'une ville Romaine, par Grignon. Paris 1775, 8vo. p. 111. Nous avons trouvé un petit bout d'ortrait d'une ligne de diametre et de trois lignes de longueur.

‡ Von Murr, Beſchreibung der Merkwürdigkeiten in Nürnberg, 1778, 8vo. p. 229.

‖ Some explain the following words in the twelve tables of the Roman laws: *Cui auro dentes vincti ſunt*, as alluding to this circumſtance. Funke however does not admit of this explanation, becauſe he does not believe it poſſible to bind a tooth in that manner. *Leges duodecim tabularum illuſtratæ* a J. N. Funcio. Rintelii 1774, 4to. p. 462. It has, nevertheleſs, been ſufficiently confirmed both by ancient and modern phyſicians. *Celſus, de medicina*, lib. vii. cap. 12: Si ex ictu vel alio caſu aliqui labant dentes, auro cum his qui bene hærent vinciendi ſunt. Compare with the above *Hippocrates de articulis*, fol. 1595, ſect. 6, p. 68, 70. *C. G. Ludwig*, *Inſtitutiones chirurgiæ*, Lipſiæ 1764, 8vo. p. 323.

The greateſt improvement ever made in thi sart was undoubtedly the invention of the large drawing-machine, which is driven by water, and in which the axle-tree, by means of a lever, moves a pair of pincers, that open as they fall against the drawing plate; lay hold of the wire, which is guided through a hole of the plate; ſhut as they are drawn back; and in that manner pull the wire along with them *. What a pity that neither the inventor

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* A deſcription of this excellent machine may be found in *Sprengels Handwerken*, iv. p. 208; *Cancrinus Beſchreibung der vorzüglichſten bergwerke*, Frankf. 1767, 4to. p. 128; in the tenth volume of the plates to the *Encyclopédie*, under the article *Tireur et fileur d'or*; in *der Pariſer kunſthiſtorie*, and other works. Mr. von Murr quotes a very ingenious deſcription of it by the well-known poet Eobanus Heſſus, who died in 1540, which I ſhall here inſert. It ſtands in *Urbs Norimberga*, 1532.

Namque quis aſpiciens quanta ſe mole rotarum
Volvat opus, quanta ferrum vi diſtrahat ut ſit
Perfectum ingenio, jam poſſit ut unus et alter
Quod non mille viri poterant nondum arte reperta.
Iſta videns quis non miretur? et omnia retro
Sæcula deſidiæ damnet, qui talia nunquam
Cognorint noſtrorum hominum præclara reperta?
Magna rota ingentem vi fluminis acta cylindrum
Fert ſecum, volvitque rotans, pars ultima cujus
Dentibus armata eſt crebris, qui fortiter acti
Obſtantes ſibi machinulas rapiuntque feruntque,
Ni rapiant remoraturos ipſoſque rotamque
Undaſque gravidumque ingenti mole cylindrum.
Ergo ubi vi tanta correpta eſt machina pendens
Inferius, molem ſupra movet ocyus omnem,
Inſtrumenta regens, quibus atri lamina ferri

tor nor the time when this machine was invented is known! It is, however, more than probable that it was firſt conſtructed at Nuremberg by a perſon named Rudolf, who kept it long a ſecret; and by theſe means acquired a conſiderable fortune. Conrade Celtes, who wrote about the year 1491, is the only author known at preſent, who confirms this information; and he tells us that the ſon of the inventor, ſeduced by avaricious people, diſcovered to them the whole ſecret of the machinery; which ſo incenſed the father, that he would have put him to death, had he not ſaved himſelf by flight*. Mr. von Murr, however, has

Scinditur, et varios rerum tenuatur in uſus,
Nunc has, nunc alias aptas aſſumere formas,
Vi nempe indomita juſſu parere coacta.
Ferrea nam videas capita aſſimulata dracones,
Alterum alterius morſu divellere ferrum
Dentibus; hic retinet, maſſam trahit ille draconum.
Ac hoc dum faciunt, ita ſe perniciter urgent,
Certantes crebris inter ſe aſſultibus, ac ſi
Pro vita non pro ferro certatur utrimque:
Atque ita dum rapidis ferrum rude morſibus arcent,
In filum teres expoliunt, quod ab ore receptum
Vipereo, adſiſtens in mille volumina curvat.
Quis Deus hanc, quis tam memorabilis artem
Oſtendit caſus? Non ille aut Thracius, aut Cres,
Aut Italus fuit, ingenio qui claruit illo,
Unde hanc humanis conceſſerit uſibus artem;
Sed Germanus erat, ſed Noricus, &c.

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* This account may be found vol. i. p. 197 of the before-quoted work, *Urbis Norimbergæ deſcriptio*, Hagenoæ 1518, fol. cap.

has not been able to find any proofs of this circumſtance; and amongſt the names of wire-drawers, which he met with in the records of Nuremberg, it appears that there muſt have been no Rudolf, elſe he would certainly have mentioned it. Doppelmayer *, from mere conjecture, places Rudolf's invention in the year 1400; but Mr. von Murr makes it older, becauſe he found in the year 1360 the name Schockenzier, which ſignifies a perſon who works at wire-drawing.

This art, it appears, was brought to the greateſt perfection at Nuremberg. Several improvements were from time to time found out by different perſons, who turned them to their advantage, and who received excluſive patents for uſing them, ſometimes from the emperor, and ſometimes from the council, and which gave occaſion to many tedious law-ſuits. We have, however,

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cap. 5. Ferunt ibi primum artem extenuandi ducendique radii per rotarum labores inventam a quodam Rudolfo, qui dum artem velut arcanum occultaret, magnaſque ex ea divitias conquireret, ob hoc cæteris civibus, quemadmodum uſu venit in lucroſis proventibus, maxime apud auctionarios, inquirendæ ejus artis cupidinem injeciſſe, qui filium ejus induxerant et corruperant, ut interiorum rotularum labores et tenellas, quæ ferream bracteolam per anguſtum foramen prendunt, ſicque pertinaciter trahendo extenuant, archetypo aliquo exprimeret; quod factum dum pater comperit, velut in inſaniam et furorem actus, filium trucidare ſtatuiſſe ferunt, niſi ſe ille aſpectui ſuo ſubtraxiſſet, manibuſque elapſus, abſfugiſſet.

* Nachricht von Nürnbergiſchen künſtlern, p. 281.

reaſon to believe that the finer kinds of work, particularly in gold and ſilver, were carried on with great ſucceſs, above all, in France and Italy; and that many improvements were brought from theſe countries to Germany. I have not materials ſufficient to enable me to give a complete account of the progreſs of the art of wire-drawing at Nuremberg; but it affords me pleaſure that I can communicate ſome important information on this ſubject, which was publiſhed[*] by Dr. F. C. G. Hirſching of Erlangen, taken from original papers reſpecting the wire-drawing manufactory at Nuremberg[†], and which I ſhall here inſert.

In the year 1570, a Frenchman, named Anthony Fournier[‡], firſt brought to Nuremberg the art of drawing wire exceedingly fine, and made conſiderable improvement in the apparatus uſed for that purpoſe. In 1592 Frederick Hagelſheimer called alſo Held, a citizen of Nuremberg, began to prepare, with much benefit to himſelf, fine gold and ſilver wire, ſuch as could be uſed for ſpinning round ſilk and for weaving, and which before that period had been manufactured only in Italy and France. Held removed his manufactory from France to Nuremberg, and received from the magiſtrates an excluſive patent, by which no other perſon was allowed to make or to imitate the fine works which he manufactured, for the term of fifteen years. On account of the large capital and great labour which was required to eſtabliſh this manufactory, his patent was by the ſame magiſtrates continued in 1607 for fifteen years more.

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[*] In the Journal des Freyherrn von Bibra.

[†] Journal von und für Teutſchland, 1788, achtes ſtück, p. 102.

[‡] Mr. von Murr ſays in his Journal, v. p. 88, that in the laſt century John Fournier, at Freyſtadtlein, ſix miles from Nuremberg, and in Nuremberg Frederick Held, of the ancient family of Hagelſheimer, were the firſt perſons in Germany who raiſed themſelves and acquired great riches by a manufactory for flatted gold and ſilver wire.

As this patent comprehended only fine work, and the city of Nuremberg, and as works of copper gilt with ſilver or gold were of great importance, he obtained on the 19th of March 1608, from the emperor Rodolphus II, an extenſion of his patent, in which theſe works were included, and by which power was granted to him to ſeize, in any part of the Empire, as well as in Nuremberg, imitations of his manufactures made by others, or ſuch of his workmen as might be enticed from his ſervice.—A prolongation of his patent for fifteen years was again granted to him, at the ſame time.

After the death of the emperor Rodolphus, his patent was in every thing renewed, on the 29th of September 1612, by the emperor Matthia, and extended to the term of fifteen years more. On the 16th of June 1621, the Nuremberg patent expired; and the ſame year the family of Held, with conſent of the magiſtrates of Nuremberg, entered into an agreement, in regard to wages and other regulations, with the maſter wire-drawers and piece-workers *, which was confirmed in another patent granted to Held on the 28th of September 1621, by the emperor Ferdinand II, agreeably to the tenor of the two patents before mentioned, and which was ſtill continued for fifteen years longer. On the 26th of September 1622 this patent, by advice of the imperial council, and without any oppoſition, was converted into a fief to the heirs male of the family of Held †, renewable at the expiration of the term ſpecified in the patent.

It appears that in the fifteenth century there were flatting-mills in ſeveral other places as well as at Nuremberg. In the town-books of Augſburg there occurs, under the year 1351, the name of a perſon called *Chunr. Tratmuller de Tratmul*, who certainly ſeems to have been a wire-drawer. In 1545, Andrew Schulz brought to that city the art

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* Piece-workers were ſuch maſters as were obliged to work privately by the piece: becauſe, according to the imperial patent, no one except Held or thoſe whom he permitted durſt carry on this buſineſs. For this permiſſion it was neceſſary to pay a certain ſum of money.

† The family at this period conſiſted of Frederick Held and his three ſons Bartholomew, Frederick and Paul.

of

of wire-drawing gold and ſilver, which he had learned in Italy. Before this period that art was little known in Germany; and Mr. von Stetten mentions an Imperial police ordinance of the year 1548, in which gold fringes are reckoned among thoſe wares for which large ſums were at that time ſent out of the Empire. Schulz obtained a patent from the council, but his attempt proved unſucceſsful. The buſineſs, however, was undertaken afterwards in Augſburg by others, and in particular by an opulent mercantile family named Hopfer, who beſtowed great pains to eſtabliſh it on a permanent footing. For this purpoſe they invited from Venice Gabriel Marteningi and his ſon Vincent, who were excellent workmen and had great experience in the art. George Geyer, who learned under them, was the firſt perſon who introduced the flatting of wire at Augſburg; and he and his ſon endeavoured for a long time to monopolize the employment of wire-drawing, and to prevent other people from engaging in it near them. In the year 1698 M. P. Ulſtatt, John George Geyer, Joſeph Matti and Moriz Zech obtained a new patent, and out of gratitude for this favour they cauſed a medal to be ſtruck, which deſerves to be reckoned among the moſt beautiful works of Philip Henry Muller, the artiſt who cut the die.

In the year 1447 there was a flatting-mill at Breſlau;

Breſlau [*]; and another, together with a burniſhing-mill, was conſtructed at Zwickau [†] in 1506. All the wire in England was manufactured by the hand till 1565, when the art of drawing it with mills was introduced by foreigners [‡]. Before that period the Engliſh wire was bad; and the greater part of the iron wire uſed in the kingdom, as well as the inſtruments employed by the wool-combers, was brought from other countries. According to ſome accounts, however, this art was carried to England at a much later period; for we are told that the firſt wire-making was eſtabliſhed at Eſher by Jacob Momma and Daniel Demetrius [‖]. Anderſon himſelf ſays that a Dutchman conſtructed at Sheen, near Richmond, in 1663, the firſt flatting-mill ever ſeen in England [§].

Iron-wire in France is called *fil d'Archal*; and the artiſts there have an idea, which is not improbable, that this appellation took its riſe from one Richard Archal, who either invented or firſt eſtabliſhed the art of drawing iron wire in that country.

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[*] Von Breſlau, Documentirte geſchichte, ii. 2. p. 409.

[†] Chronica Cygnæa, oder Beſchreibung der ſtadt Zwickau; durch Tob. Schmidten. Zwickau 1656, ii. p. 254.

[‡] Anderſon's Geſchichte des handels, iv. p. 101.

[‖] Huſbandry and trade improved, by John Houghton. London 1727, 8vo. ii. p. 188.

[§] Anderſon, v. p. 484.

try. The expreſſion *fil de Richard* is therefore uſed alſo among the French wire-drawers [*]. Of this Archal, however, we know as little as of the Nuremberg Rudolf; and Menage will not admit the above derivation. He is of opinion that *fil d'Archal* is compounded of the Latin words *filum* and *auricbalcum* [†].

To conclude this article, I ſhall add a few obſervations reſpecting filigrane works and ſpangles. The firſt name ſignifies a kind of work of which one can ſcarcely form a proper idea from a deſcription. Fine gold and ſilver wire, often curled or twiſted in a ſerpentine form, and ſometimes plaited, are worked through each other and ſoldered together ſo as to form feſtoons, flowers and various ornaments; and in many places alſo they are frequently melted together by the blow-pipe into little balls, by which means the threads are ſo entwiſted as to have a moſt beautiful and pleaſant effect. This work was employed formerly much more than at preſent in making ſmall articles, which ſerved rather for ſhow than for uſe; ſuch as needle-caſes, caſkets to hold jewels, ſmall boxes, particularly ſhrines, decorations for the images of ſaints and other church furniture [*]. Work of this kind is called *filagrame*, *filigrane*, *ouvrage de filigrane*; and it may be readily perceived that theſe words are compounded of *filum* and *granum*. We are told in the *Encyclopédie* that the Latins called this work *opus filatim elaboratum*: but this is to be underſtood as alluding to the lateſt Latin writers; for *filatim* occurs only once in Lucretius, who applies it to woollen thread.

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[*] Dictionnaire de commerce, par Savary, ii. p. 599. Dictionnaire des origines, par D'Origny, ii. p. 285.

[†] Dictionnaire étymologique, i. p. 593. The author quotes the following paſſage from a French bible printed at Paris in 1544: Ne ayes pas merveilles, ſi tu lis en aucuns lieux à la fois, que ces choſes eſtoient d'airain, et à la fois arcal; car airain et arcal eſt un meſme metal.

This art, however, is of great antiquity, and appears to have been brought to Europe from the Eaſt. Grignon informs us that he found ſome remains of ſuch work in the ruins of the Roman city before mentioned [†]. Among church furniture we meet with filigrane works of the middle ages. There was lately preſerved in an abbey at Paris, a croſs ornamented with filigrane work, which was made by St. Eloy, who died in 665; and the greater part of the works of that ſaint are decorated in the like manner [‡]. In the collection of relics at Hanover is ſtill to be ſeen a croſs embelliſhed with this kind of work, which is ſaid to be as old as the eleventh or twelfth century *. The Turks, Armenians and Indians make at preſent maſter-pieces of this ſort, and with tools exceedingly coarſe and imperfect. Marſden extols the ingenuity of the Malays on the ſame account †; and articles of the like nature, manufactured at Decan, are, we are told, remarkably pretty, and coſt ten times the price of the metal employed in forming them ‡. This art is now neglected in Europe, and little eſteemed. Augſburg, however, a few years ago had a female artiſt, Maria Euphroſ. Reinhard, celebrated for works of this kind, who died in 1779. In 1765 ſhe ornamented with filigrane work ſome ſilver baſons, which were ſent to Ruſſia for the uſe of the church, and which gained her great honour ||.

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[*] Some account of this work may be found in *Halle's Werkſtate der künſte*, i. p. 101; and *Jacobſon's Technologiſches Wörterbuch*, i. p. 721.

[†] Bulletin des fouilles d'une ville Romaine, i. p. 22: Une piece en filigrane, ſous la forme d'une ſphere applatie, ayant un trou circulaire au centre; elle eſt composée de fils de laiton, tors et unis entre eux, comme les mailles d'un reſeau.

[‡] Menage, Dictionnaire étymologique, i. p. 593.

Spangles, *paillettes*, are ſmall, thin, round leaves of metal, pierced in the middle, which are ſewed

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* J. H. Jungii Diſquiſit. de reliquiis ; accedit Lipſanographia ſive Theſaurus reliquiarum electoralis Brunſuico-Luneburgicus. Hanoveræ 1783, 4to. p. 19, 29, 56. Of ſome articles there are figures.

† The hiſtory of Sumatra. London 1783, 4to. p. 145.

‡ Der Miſtreſs Kinderſley Briefe von der Inſel Teneriffa und Oſtindien. Leipzig 1777, 8vo. The jeſuit Thomans praiſes the negroes of Monomotapa on the ſame account. See his Reiſe- und Lebensbeſchreibung. Augſburg 1788, 8vo.

|| Von Stetten, Kunſtgeſchichte, i. p. 489, and ii. p. 287.

on as ornaments; and though they are well known, it might be difficult for thoſe who never ſaw them manufactured, or read an account of the manner in which they are prepared, to conceive how they are made. The wire is firſt twiſted round a rod into the form of a ſcrew; it is then cut into ſingle ſpiral rings, like thoſe uſed by pin-makers in forming heads to their pins; and theſe rings being placed upon a ſmooth anvil are flatted by a ſmart ſtroke of the hammer, ſo that a ſmall hole remains in the middle, and the ends of the wire which lie over each other are cloſely united. I remember to have ſeen on old ſaddle-cloths and horſe furniture large plates of this kind; but the ſmall ſpangles ſeem to be of later invention. According to Lejiſugo*, whoſe real name I do not know, they were firſt made in the French gold and ſilver manufactories, and imitated in Germany, for the firſt time, in the beginning of the laſt century. The method of preparing them was long kept a ſecret.

BUCK-WHEAT.

GRASSES alone, and of theſe thoſe only the ſeeds of which are ſo abundant in an eatable farinaceous ſubſtance that they deſerve to be cultivated as food to man, are properly corn. Notwithſtanding this definition, buck-wheat, which belongs to a kind of plants that grow wild in Europe, knot-graſs, water-pepper, &c. becauſe it is ſown and employed like corn, is commonly reckoned to be corn alſo. Our wheat and oats, however, were not produced from indigenous graſſes, as has been the opinion of ſome learned naturaliſts, who, nevertheleſs, were not botaniſts; nor has buck-wheat been produced from the above-mentioned wild plants *. Both theſe aſſertions can be proved by the ſtrongeſt botanical evidence; and the latter is ſupported by hiſtorical teſtimony, which cannot be adduced in regard to the proper ſpecies of corn, as they were uſed before the commencement of our hiſtory.

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* Bericht von Dratziehen, p. 192.

Two centuries ago, when botaniſts ſtudied the ancients, and believed that they had been acquainted with and given names to all plants, ſome of them maintained that buck-wheat was their *ocimum:* others have conſidered it as the *eryſimum* of Theophraſtus; and ſome as the *panicum* or *ſeſamum*.

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* It cannot however be denied that ſome indigenous graſſes might be brought, perhaps, by culture to produce mealy ſeeds that could be uſed as food. It is at any rate certain that ſome graſſes, for example the ſlender ſpiked cock's-foot panic-graſs, *panicum ſanguinale*, which we have rooted out from many of our gardens, was once cultivated as corn, and is ſtill cultivated in ſome places, but has been abandoned for more beneficial kinds. This plant may have been produced from ſome indigenous ſpecies of the buck-wheat.

All theſe opinions, however, are certainly falſe. It is indeed difficult to determine what plant the *ocymum* of the ancients was; but it may be eaſily proved that it was not buck-wheat, as Bock or Tragus * has confidently aſſerted. The *ocimum*, or a ſpecies of that name, for it ſeems to have been applied to ſeveral vegetable productions, was a ſweet-ſmelling plant, called alſo, at leaſt by later writers, *baſilicum* †; one kind of *ocimum* had a thick, woody root ‡, and others poſſeſſed a ſtrong medicinal virtue ‖. The ancient writers on agriculture give it a place between the garden flowers and the odoriferous herbs §; but none of theſe deſcriptions can be applied to our buck-wheat, which is both inſipid and deſtitute of ſmell. Two unintelligible paſſages of an ancient writer on huſbandry make *ocimum* to have been a plant uſed for fodder, or rather a kind of green fodder or meſlin compoſed of various plants mixed together ¶. The

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* "If the learned would lay aſide diſputing and give place to truth, they would be convinced, both by the ſight and the taſte, that this plant (buck-wheat) is the *ocymum* of the ancients." *Kreuterbucb*, Augſburg 1546, fol. p. 248.

† Heſychius: Ωκιμον. Βοτανη ευωδης το λεγομενον Βασιλικον.

‡ Theophraſt. Hiſt. plant. lib. vii. cap. 3.

‖ Dioſcor. lib. ii. cap. 171.

§ Geopon. lib. ix. cap. 28.

¶ Varro, lib. i. cap. 31. That a kind of meſlin is here to be underſtood, has been ſuppoſed by Stephanus, in his *Prædium ruſticum*, *eryſimum* of Theophraſtus produced ſeeds which had a very hot acrid taſte [*]; and he doubts whether it was eaten by cattle [†]. Pliny ſays expreſsly that it ought to be claſſed rather among medicinal plants than thoſe of the corn-kind [‡]; though Theophraſtus has mentioned it more than once among the latter.

It is not worth the trouble to enter into an examination of more opinions of the like kind, as ſeveral reſpectable writers, who lived in the beginning of the ſixteenth century, conſider buck-wheat to be a plant firſt introduced into Europe in their time, though they are not all agreed in determining its native country. John Bruyerinus, or, as he was properly called, La Bruyere-Champier, phyſician to Francis I, king of France, who in the year 1530 wrote his book, often printed, *De re cibaria* [||], ſays

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ruſticum, p. 493; and Matthiolus is of the ſame opinion. See *Matthioli Opera*, p. 408. Buck-wheat may have been employed green as fodder; and it is indeed often ſown for that uſe; but there are many other plants which can be employed for the like purpoſe.

[*] Dioſcorid. lib. ii. cap. 188.

[†] Theophraſt. ed. Stap. p. 941.

[‡] Plin. lib. xviii. cap. 10. Medicaminibus annumerandum potius quam frugibus. He ſays in the ſame place, and alſo p. 291, that the *eryſimum* was by the Latins called alſo *irio*; and hence it is that Ruellius and other old botaniſts give that name to buck-wheat.

[||] The firſt edition was publiſhed in octavo, at Lyons, in 1560.

ſays that buck-wheat had been firſt brought to Europe a little before from Greece and Aſia. That

Two editions I have now before me ; the firſt is called *Dipnoſophia ſeu Sitologia. Eſculenta et poculenta quæ cuivis nationi, homini, ſexui, ſanis, ægris, ſenibus, juvenibus, idonea vel minus, uſu probata complectens omnia.* Auctore Joanne Bruyerino Campegio Lugdunenſi. *Reviſa, emaculata, duplicique indice locupletata* ab Othone Caſmanno. E. S. Francofurti, 1606, 8vo. What Caſmann did to this edition I cannot diſcover : perhaps he corrected the errors of the preſs. The preface even is not written by him, but by Peter Uffenbach, doctor of phyſic at Franckfort, who calls this edition *tertia omnibus mendis caſtigata.* The other is entitled *Joan. Bruyerini Cibus medicus, ſive de re cibaria libri viginti duo, omnium ciborum genera, omnium gentium moribus et uſu probata, complectentes.* Norimbergæ, 1659, 8vo. The author's preface, which is wanting in the firſt edition, is in this given. In both, the pages run the ſame, but the latter has not the index which is added to that of 1606. The author ſays in the end, that he gave his book to be printed in 1560, but that it was written thirty years before. He was a grandſon of Symphorien Champier, whoſe works are mentioned in Haller's *Biblioth. botan.* i. p. 246. The paſſage alluded to may be found lib. v. cap. 23 : Serunt Gallici ruſtici frugem aliam non ita pridem e Græcia, Aſiave, aliove orbe ad nos invectam, folio hederaceo, ſanguineum repræſentante colorem. Scapo grandis per faſtigium panlculas exſerente, triangulis rariuſcule coacervatis gravis *(granis ?)*, quæ foliaceis membranis concepta detinentur. Vulgus Turcicum frumentum nominat. Nonnulli in caritate annonæ panes ex eo fingunt. Pinſitum certe candoris eximii reddit farinam. Sed in primis pecori majori minorique gratiſſimum eſt ; ejuſque uſu mire ſagina gliſcit. Scio a quibuſdam Lugdunenſibus ſatum in agro Delphinate, Villurbano dicto, et feliciter erupiſſe. Certum eſt, columbis quoque eſſe jucundiſſimum. Belloiocenſes quoque, Lugdunenſibus vicini, feliciter ſerunt, eoque panificia ſua augent.

well-known botaniſt Ruellius [*], who wrote in 1536, and Conrade Hereſbach [†], who died in 1576, give the ſame account. The latter calls the northern part of Aſia the original country of this plant, or that from which it had a little before been brought to Germany. A nobleman of Brittany, whoſe book *Les contes d'Eutrapel* [‡], was printed after his death in 1587, remarks occaſionally, that at the time when he wrote buck-wheat had been introduced into France about ſixty years, and that it had become the common food of the poor.

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[*] *De natura ſtirpium;* Baſiliæ 1543, fol. p. 324: Rura noſtra ſerunt frugem in agris folio hederaceo, ſanguineum colorem præferente, ſcapo grandi per faſtigium paniculas exerente, triangulis rariuſcule coacervatis granis, quæ foliaceis membranis concepta detinentur. Hanc, quoniam avorum noſtrorum ætate e Græcia vel Aſia venerit, Turcium frumentum nominant. *It may be eaſily ſeen that Ruellius has copied La Bruyere-Champier, and from his account we may rectify ſome errors of the preſs in the latter.*

[†] Frumentum hoc non ita pridem e Sarmatiæ ſeptemtrionalibus oris in Germaniam advectum, jam in frequenti uſu, et ſuibus ſaginandis et pultibus faciendis, aliiſque frumentis deficientibus, cum annonæ premit penuria, et cervifiæ et pani conficiendo plebi uſurpatur. *Rei ruſticæ libri quatuor.* Spiræ Nemetum 1595, 8vo. p. 120. He calls it triticum faginum, φαγοπυρον, or nigrum triticum, buck-wheat.

[‡] Le Grand d'Auſſy quotes from this book in his *Hiſtoire de la vie privée des Français*, i. p. 106, the following words: Sans ce grain, qui nous eſt venu depuis ſoixante ans, les pauvres gens auraient beaucoup à ſuffrir. Of the work, according to the French manner, he gives no account. *Eutrapel* is only a fictitious name—Ευτραπελος.

Martin Schook [*] wrote in 1661, that buck-wheat had been known in Flanders ſcarcely a hundred years. The old botaniſts, Lobelius, the brothers Bauhin, Matthiolus, and others, all aſſert, that this grain was new in Europe [†]. I ſhall here remark, that Creſcentio, who lived in the thirteenth century, and deſcribed all the then known ſpecies of corn, makes no mention of buck-wheat. It undoubtedly acquired this name from the likeneſs which its ſeeds have to the fruit of the beech-tree [‡]; and in my opinion, another name, that of *heidenkorn* (heath-corn), by which it is known in Germany, has been given it becauſe it thrives beſt in poor ſandy ſoil where there is abundance of heath. From the epithets *Turcicum* and *Saracenicum*, its native country cannot be determined, for maize is called Turkiſh wheat, though it originally came from America. I conſider alſo as improbable the conjecture of the learned Friſch[*], that from the word *heide* (a heathen), an expreſſion little known in Upper Germany, has ariſen the appellation of *ethnicum*[†], and thence *Saracenicum*, given to this plant, though the Bohemians call it *pohanka*, from *pohan*, which ſignifies alſo a heathen.

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[*] *Martini Schookii Liber de cerviſia.* Groningæ 1661, 12mo. p. 52: Frumentum hoc vix ante centum annos notum fuit Belgio, ſed e Sarmatiæ ſeptemtrionalibus oris advectum, mox cœpit eſſe in frequenti uſu, et non modo pultibus faciendis, ſed cerviſiæ ſervire cœpit. *Almoſt the words of Hereſbach.*

[†] Lobelii Stirpium adverſaria. Antverpiæ 1576, fol. p. 395. Bauhini Hiſtor. plant. ii. p. 993. Chabræi Stirpium ſciographia. Genevæ 1666, fol. p. 312, and in the appendix, p. 627. C. Bauhini Theatrum botan. p. 530.

[‡] The beech-tree in German is called *buche* or *buke*; in Daniſh it is *bög*, and in the Swediſh, Ruſſian, Poliſh and Bohemian, *buk*. TRANS.

There is reaſon to believe, that this grain muſt have been common in may parts of Germany in the fifteenth century. In a bible, printed in Low German, at Halberſtadt, in the year 1522, entitled *Biblia Dudeſch*, the tranſlator, who is not known, but who is ſuppoſed to have been a catholic, tranſlates a paſſage of Iſaiah, chap. xxviii. v. 25, which Luther tranſlates *er ſäet ſpelz*, he ſoweth ſpelt, by the words *he ſeyet boekwete*, he ſoweth buck-wheat[‡]. The name *heydenkorn* occurs in a catalogue of plants ſo early as the year 1552*; and Joſ. Maaler, or Pictorius, has in his Dictionary, printed in octavo, at Zurich in 1561: Heidenkorn, *Ocimum*. I find there alſo, Heydel, a plant, *Panicum*. Daſypodius † likewiſe in his Dictionary, of which I have the edition printed in 1537, ſays *Panicum*, Butzweyſs, Heydel; and in a vocabulary of the names of plants, added to it: Heydel, *Panicum*. Butz Weyſz, *Panicum*. Friſch has the word Heydel-Fench, which he explains by Buck-wheat; and he remarks that in the Swiſs dialect *Buch* is changed into *Butz*. Ryff or Rivius, a phyſician who lived in the middle of the ſixteenth century, has changed *Buch* or *Book* into *Bauch*, and ſuch errors often ariſe by transforming the High into Low German. It has however analogy in its ſavour, for the long *o* of the Low German is in High German often changed into *au*;

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[*] In Teutſchen Wörterbuche, p. 434. This derivation may be found alſo in *Martinii Lexicon*, art. *Fagopyrum*.

[†] Buck-wheat is ſometimes named by botaniſts *frumentum ethnicum* (heathen-corn), and *triticum Saracenicum*, becauſe ſome have ſuppoſed that it was introduced into Europe from Africa by the Saracens. TRANS.

[‡] A particular deſcription of this ſcarce bible may be found in J. H. a Seelens Selecta litteraria; Lubecæ 1726, 8vo. p. 398, 409. In the Septuagint the word uſed is ζια. The reaſons aſſigned for ſuppoſing the tranſlator to have been a catholic ſeem to me of little force.

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* This ſmall work is entitled *Vocabula rei nummariæ, ponderum et menſurarum Græca, Latina, Ebraica, - - - additæ ſunt appellationes quadrupedum, et frugum* - - - collectæ a Paulo Ebero et Caſp. Peucero. Witebergæ 1552, 8vo. The paſſage to which I allude is as follows: Ireo cerealis, vel eryſimum cereale, vulgare frumentum Sarracenicum, quod a triquetra figura quidam Trigonum, appellant, *Heydenkorn*. I ſhall here take occaſion to remark, that I find in the ſame work the name *Staudenkorn* for Typha, tritico ſimillima, fœcundior olyra et altior, grana majora, et majore copia profert. The later writers on agriculture give this name to a kind of rye. We are told in *Placcii Theatrum anon*. i. p. 377, that this catalogue was written by *Joſ. Simler*.

† Dictionarium Latino-Germanicum. Argentorati, 4to.

for example *look*, *lauch*; *ſchmooken*, *ſmauchen*; *ook*, *auch*; *ooge*, *auge*. But the long *o* of the Low German becomes frequently the long *u* of the High German; as *good*, *gut*; *buch*, *buchbaum*, *book*, *bookbaum*, &c.

That buck-wheat was cultivated in England about the year 1597, is proved by Gerard's Herbal.

A new ſpecies of this grain has been made known of late years, under the name of Siberian buck-wheat, which appears by experience to have conſiderable advantages over the former. It was ſent from Tartary to Peterſburgh by the German botaniſts who travelled through that country in the beginning of the preſent century; and it has thence been diſperſed over all Europe. We are however told in the new Swediſh Economical Dictionary, that it was firſt brought to Finland by a ſoldier who had been a priſoner in Tartary *. Linnæus received the firſt ſeeds in 1737, from Gerber the botaniſt †, and deſcribed the plant in his *Hortus Cliffortianus*. After this it was mentioned by Ammann ‡, in 1739; but it muſt have been earlier known in Germany, at leaſt in Swabia; for in 1733 it was growing in the garden of Dr. Ehrhart, at Memmingen *. In Siberia this plant ſows itſelf for four or five years by the grains that drop, but at the end of that time the land becomes ſo full of tares that it is choked, and muſt be ſown afreſh †. Even in the economical gardens in Germany, it is propagated in the ſame manner; and it deſerves to be remarked that it grows wild among the corn near Arheilgen, a few miles from Darmſtadt, though it is cultivated no where in the neighbourhood ‡. Had it been indigenous there, Ehrhart might in 1733 have raiſed it from German ſeed.

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* Nya Swenſka Economiſka Dictionnairen. Stockholm 1780, 8vo. vol. ii.

† Abhandlungen der Schwediſch. Akad. der Wiſſenſchaften, vi. p. 107, where is given, as far as I know, the firſt figure of it.

‡ Stirpes rariores Imperii Ruſſici, 1739, 4to.

The appellation of *Saracenicum* gives me occaſion to add the following remark: Ruellius || ſays, that

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* This is aſſerted by Phil. Fred. Gmelin, in Ehrharts Œkonomiſche pflanzen hiſtorie, viii. p. 72. The laſt eight parts of this work were publiſhed by Gmelin after Ehrhart's death in April 1756.

† Falk, Reiſe durch Ruſsland.

‡ Romers Neues Magazin für die Botanik, vol. i.

|| *Ruellius De natura ſtirp.* lib. ii. cap. 27: Hodie Galli in hortis oſtentationis gratia ſerunt, grano piſum æquante, atro, ſtipula arundinea quinum apud nos ſenumve pedum proceritate, quod milium Saracenicum, quaſi peregrinum, nominant, nec ante quindecim annos huc advectum. Stephanus ſays almoſt the ſame thing in his *Prædium ruſticum*, p. 432: Quod autem milium in hortis noſtratibus oſtentationis gratia ſeritur, grano piſum æquante, ſti-

that in his time a plant had begun to be introduced into the gardens of France, but merely for ornament, called Saracen-millet, the ſeeds of which were brought to that country about fifteen years before. This millet, which was from five to ſix feet in height, was undoubtedly a *boleus*, and perhaps the ſame kind as that ſought after by us for cultivation a few years ago, under the name of *holcus ſorghum* *. This *holcus*, however, was cul-

tivated,

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pula arundinea, quinum apud nos ſenumve pedum proceritate, id vero peregrinum eſt, et alterius generis, unde milium Saracenicum nominant.—Some very improperly have conſidered this plant as Turkiſh-wheat.

* Several ſpecies of this genus were cultivated in the ſouthern diſtricts, the names of which may be found in my *Grundſätzen der Teutſchen Landwirthſchaſt*, p. 128. Their diſtinguiſhing characteriſtics do not however appear as yet to be fully eſtabliſhed. Bauhin makes the proper *ſorghum* to be different from the *durra* of the Arabs. The former is called in his *Theat. botanic.* p. 510, Milium arundinaceum ſive Indicum, Sorgo dictum. *Hiſtor. plant.* ii. p. 447. The *durra* in *Theat. plant.* is named milium arundinaceum ſemine plano et albo, and alſo in *Hiſtor. plantar.* ii. p. 448. Linnæus in his laſt writings has ſeparated *holcus bicolor* from *ſorghum*. Forſkal in *Flora Egyptiaco-Arabica*, Hafniæ 1775, 4to. p. 174, thus deſcribes the *durra*: Holcus panicula ovata; ſpiculis ſeſſilibus, ſubvilloſis; alternatim appendiculatis; floſculo uno vel duobus vacuis, ſeſſilibus. There are kinds of it with white and reddiſh-yellow *(fulva)* ſeeds. According to his account, however, the Arabs cultivate another kind known under the name of *dochna*, though in leſs quantity, chiefly as food for fowls. This ſpecies he calls: Holcus paniculæ ramis ſubternato-verticillatis, patentibus, rudimentis florum ſeſſilibus, ſub floribus fertilibus, ariſtatis. Semen magnitudine oryzæ; ovale, compreſſum, ferrugineum.

tivated, at leaſt in Italy, long before the time of Ruellius; for we have ſcarcely reaſon to doubt that it was the *milium Indicum*, which was brought from India to that country in the time of Pliny [*]. That ancient naturaliſt ſays, it was a kind of millet ſeven feet high; that it produced black ſeeds, and was productive almoſt beyond what could be believed. In the time of Herodotus it was cultivated at Babylon, but it muſt have been then little known to the Greeks; for that hiſtorian would not venture to mention its ſize and fertility, as he was afraid that his veracity would be called in queſtion [†]. According to his account, it grew to be as large as a tree. It is worthy of remark, that this kind of millet is ſtill cultivated at Babylon, where it was ſeen and admired by Rauwolf*. It is undoubtedly the monſtrous *holcus* mentioned by Apollonius, who conſidered it as one of the moſt remarkable productions of India †. It appears that it continued to be cultivated by the Italians in the middle ages; for it was deſcribed in the thirteenth century by Creſcentio, who ſpeaks of its uſe and the method of rearing it ‡. The ſeeds had ſome time before been brought from Italy to Germany ||, and we find that it is on that account called Italian millet. The old botaniſts called it alſo *ſorgſamen*, and *ſorgſaat*; appellations formed from *ſorghum*. The name *morhirſe*, under which it again came to us from Swiſſerland, in latter times §, has ariſen either from the black colour of one of the kinds, or it may ſignify the ſame as

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[*] *Plin.* lib. xviii. cap. 7: Milium intra hos decem annos ex India in Italiam invectum eſt nigrum colore, amplum grano, arundineum culmo. Adoleſcit ad pedes altitudine ſeptem prægrandibus culmis; lobas vocant; omnium frugum fertiliſſimum. Ex uno grano terni ſextarii gignuntur. Seri debet in humidis. Hardouin remarks that *phobas* ought to be read here inſtead of *lobas*. What gave riſe to this emendation will readily appear to thoſe who read *Theophraſt. Hiſt. plant.* lib. viii. cap. 3. Φοβη, *juba, coma*, correſponds exceedingly well with the *thyrſe, panicula diffuſa* of the *holcus ſorghum* which is ſold at Venice for brooms, as we are told by Ray in his *Hiſt. plant.* Pliny ſays, in the place above quoted, Milii comæ granum complexæ fimbriato capillo curvantur.

[†] Herodot. lib. i. cap. 193: Εκ δε κεγχρου καὶ σησάμου ὃσον τι δενδρον μεγαθος γινεται, εξεπισταμενος, μνημην ου ποιησόμαι. Milii vero ac ſeſami proceritatem inſtar arborum, etſi mihi compertam, tamen commemorare ſuperſedeo, probe ſciens, iis qui nunquam Babylonicam regionem adierunt, quæ de frugiferis dicta ſunt, incredibilia viſum iri.

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[*] Beſchreibung der reyſs Leonhardi Rauwolfen. Frankf. 1582, 4to. ii. p. 68. The author obſerves that this kind of millet is mentioned alſo by Rhaſes and Serapion.

[†] Philoſtrat. Vita Apollon. lib. iii. cap. 2. This *ſorghum* perhaps is meant alſo in *Dionyſii Periegeſis*, v. 1126. p. 134.

[‡] Melica cioe ſaggina e conoſciuta, et e di due manere, una roſſa et una bianca, e trovaſene una terza manera che a più bianca che l' miglio. *Creſcentio, D'agricoltura*. In Venetia 1542, 8vo. lib. iii. cap. 17. It appears therefore that in our dictionaries *ſaggina* ought not to be explained by Turkiſh wheat alone.

[||] Bauhini Theat. plant. l. c.

[§] Andrea, Briefe aus der Schweitz. Zurich 1776, 4to. p. 182.

Moren-hirſe (Mooriſh-millet) becauſe it is almoſt the only corn of the ſable Africans [*]. However this may be, it can never become an object of common cultivation among us, for our ſummer is neither ſufficiently long nor ſufficiently warm, to bring it to perfection. Laſt ſummer (1787) I could with difficulty obtain a few ripe grains for ſeed.

SADDLES.

IN early ages the rider ſat on the bare back of his horſe without any thing under him [†]; but, in the courſe of time, ſome kind of covering, which conſiſted often of cloth, a mattraſs, a piece of leather or hide, was placed over the back of the animal. We are informed by Pliny [‡] that one Pelethronius firſt introduced this practice; but who that perſon was is not certainly known. Such coverings became afterwards more coſtly *; they were made frequently in ſuch a manner as to hang down on both ſides of the horſe, as may be ſeen by the beautiful engravings in Montfaucon †, and were diſtinguiſhed among the Greeks and Romans by various names ‡; but even after they were common, it was reckoned more manly to ride without them. Varro boaſts of having rode, when a young man, without a covering to his horſe ||; and Xenophon §

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[*] Adanſon, Reiſe nach Senegal; überſetzt von Martini. Brandenburg 1773, 8vo. p. 56, 125.

[†] J. Lipſii Poliorcet. ſeu de militia Romana, lib. iii. dial. 7. Antverpiæ 1605, 4to. p. 142.

[‡] Lib. vii. cap. 56, Frenos et ſtrata equorum Pelethronius invenit. The ſame account is given by *Hyginus*, fab. 274.

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* Coverings for horſes made of the coſtly ſkins of animals are mentioned by *Silius Italicus*, lib. iv. 270, and lib. v. 148. In the latter place he ſays—

> Stat ſonipes, vexatque ferox humentia frena,
> Caucaſium inſtratus virgato corpore tigrim.

They are mentioned alſo by *Statius*. See *Thebaid.* lib. iv. 272. Coſtly coverings of another kind occur in Virgil, Æneid. lib. vii. 276; viii. 552; and Ovid. Metam. lib. vii. 33. Livy, lib. xxxi, cap. 7, comparing the luxury of the men and the women, ſays; Equus tuus ſpecioſius inſtructus erit, quam uxor veſtita.

† Antiquité expliquée, tom. ii. lib. 3. tab. 27, 28, 29, 30.

‡ Seneca, Epiſt. 80: Equum empturus, ſolvi jubes ſtratum. *Macrob. Saturnal.* i. 11: Stultus eſt, qui, empturus equum, non ipſum inſpicit, ſed ſtratum ejus et frenum. *Apuleius*, *De Deo Socratis*, calls theſe coverings for horſes *fucata ephippia.*—They were called alſo ϛρωματα.

|| Nonius Marcellus, De proprietate ſermonum, 2. p. 545: Ephippium, tegmen equis ad mollem vecturam paratum. *Varro*, *Cato*, *vel de educandis liberis:* Mihi puero - - - - equus ſine ephippio.

§ Nunc autem ſtragula (ϛρωματα) plura in equis habent, quam in lectis; non enim tam equitationis curam habent, quam mollioris ſeſſionis. *Pæd.* lib. viii.

reproaches the Perſians becauſe they placed more clothes on the backs of their horſes than on their beds, and gave themſelves more trouble to ſit eaſily than to ride ſkilfully. On this account ſuch coverings were for a long time not uſed in war; and the old Germans, who conſidered them as diſgraceful, deſpiſed the Roman cavalry who employed them *. The information, therefore, of Dion Caſſius †, according to whom ſuch coverings were firſt allowed to the Roman cavalry by Nero, is very doubtful. This author, perhaps, alludes

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* Neque eorum moribus turpius quidquam aut inertius habetur quam ephippiis uti. Itaque ad quemvis numerum ephippiatorum equitum quamvis pauci adire audeunt. *Cæſar, De bello Gallico*, lib. iv. 2. An old ſaddle with ſtirrups was formerly ſhewn to travellers at Berne in Switzerland, as the ſaddle of Julius Cæſar. See *Relations hiſtoriques et curieuſes de voyages*, par C. P. (Patin.) A Rouen 1676, 12mo. p. 270. The ſtirrups, however, were afterwards taken away, and in 1685 they were not to be ſeen. *Mêlanges hiſtoriques, recueillis et commentez par Monſ.* ———. A Amſterdam 1718, 12mo. p. 81.

† Lib. lxiii. 14. Ferunt equites Romanos militantes, Neronis temporibus, dum quotannis recenſentur, primum ephippiis uſos fuiſſe. Εν τῃ ετησιᾳ σφων ἐξετασει. After writing the above, I found with ſatisfaction that Le Beau, in *Memoires de litterature de l'Académie des Inſcriptions*, vol. xxxix. p. 333, forms the ſame conjecture. Before that period the cavalry, when reviewed, were obliged to produce their horſes without any covering, that it might be more eaſily ſeen whether they were in good condition. This uſeful regulation was aboliſhed by Nero, in order that the cavalry might exhibit a grander appearance. He employed his ſoldiers for ſhow, as many princes do at preſent. *Animum modo uti paſcat proſpectu inanem.* Virgil. Georg. lib. ii. 285.

only to reviews, at which, it is probable, the cavalry were before obliged always to appear without them. In the time of Alexander Severus, the horſes of the whole Roman cavalry had beautiful coverings *. Saddles, however, at that period were certainly unknown, though they afterwards obtained the old name *ephippium*, which originally ſignified nothing more than a covering for a horſe. Xenophon ſays, a rider, whether placed on the bare back of the animal or on a covering, muſt not aſſume a poſition as if he ſat upon one of thoſe ſeats which people uſe in carriages †.

Our ſaddles at preſent conſiſt of a wooden frame called the ſaddle-tree, which has on the fore part the pommel; behind it the crupper; and at the ſides the ſtirrups. In the inſide they are ſtuffed like a cuſhion, and on the outſide are covered with leather or cloth. They are made faſt to the horſe by means of a girth which goes round the animal's belly; and the breaſt-leather and crupper prevent them from being moved either forwards or backwards. It is extremely probable that they were invented in the middle of the fourteenth century: but it is hardly poſſible to find any certain proof; for we have reaſon to believe that the ancient covering was gradually transformed into a ſaddle. Pancirollus [*] thinks that the firſt mention of a ſaddle is to be found in Zonaras; and many have adopted his opinion. This hiſtorian relates that Conſtantine the younger was killed in the year 340 when he fell from his ſaddle. But in this proof alone I place very little confidence; and Pancirollus ſeems to have founded his aſſertion on the Latin tranſlation, in which the word *ſella* is uſed. Both the Greek and Latin terms [†], it is true, were employed at later periods to ſignify a proper ſaddle; but the Greek word was uſed long before for the back of the horſe, or the place where the rider ſat; and the words of Zonaras may be ſo underſtood as if Conſtantine was killed after he had fallen from his horſe [‡].

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* Equis etiam inſtructi et ephippiis et frenis decentibus, ut Romanam rempublicam intelligeret quicumque Alexandri vidiſſet exercitum. *Lamprid. Vita Alex. Severi*, cap. 50.

† De re equeſtri, p. 602: Επει δ'αν γε μην καθιζηται, εαν τε επι ψιλου, εαν τε επι του εφιππιου, ου την ὡσπερ επι του διφρου ἑδραν επαινουμεν. Sive ſuper nudo equo, ſeu etiam in ephippio reſederit, non laudatur quaſi curulis quædam ſeſſio, ſed ut cruribus divaricatis maxime rectitudo cuſtodiatur. Reſpecting the ſtool or chair placed in carriages for people to ſit on, του διφρου ἑδρα, ſee *Pitiſci Lexic. antiq.* iii. p. 369, art. *Sella curulis.*

Montfaucon

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[*] De rebus deperditis, lib. ii. tit. 16. p. 273.

[†] Ἑδρα and ſella.

[‡] Zonaras, lib. xiii. cap. 5. Paris 1687. fol. ii. p. 12. Εκπιπτει της ἕδρας ὁ Κωνςαντινος. Nicetas in Andronicus Comnenus, lib. i. p. 183: Της ἕδρας αποβαλλεται. The word ἕδρα occurs twice in *Xenophon De re equeſtri.* In page 596 of the before-mentioned edition, an account is given how the back of the horſe ſhould be ſhaped in order that the rider may have a faſt and ſecure ſeat: τῳ αναβατῃ ασφαλεςεραν την ἕδραν; and in p. 600, where he ſpeaks

of

Montfaucon * has given a figure of the pillar of Theodoſius the Great, on which he thinks he can diſtinguiſh a ſaddle; and indeed, if the engraving be correct, it muſt be allowed that the covering of the horſe on which the rider ſits ſeems, in the fore part, to reſemble the pommel, and behind the extremity of the ſaddle-tree of our common ſaddles.

The cleareſt proof of the antiquity of ſaddles is the order of the emperor Theodoſius in the year 385, by which thoſe who wiſhed to ride poſt-horſes were forbidden to uſe ſaddles that weighed more than ſixty pounds. If a ſaddle was heavier it was to be cut to pieces †. This paſſage appears certainly to allude to a proper ſaddle, which at that period, ſoon after its invention, muſt have

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of currying, the author ſays that the hair on a horſe's back, εν τῃ ῥαχει, ought to be combed down, as the animal will then be leſs hurt by his rider: ἥκιϛα γαρ αν βλαπτοι την ἕδραν του ἱππου. I have taken the trouble to conſult other hiſtorians who give an account of the death of Conſtantine; but they do not mention this circumſtance. See *Zoſimus*, lib. ii. 41; *Victor. Epitome*, cap. 41; *Socrates*, lib. ii. 5; *Eutropius*, lib. x. 5.

* Antiq. expliquée, vol. iv. lib. iii. cap. 75, tab. 30.

† Quoniam veredorum quoque cura pari ratione tractanda eſt, ſexaginta libras ſella cum frenis; triginta quinque vero averta non tranſeat; ea conditione, ut ſi quis præſcripta moderaminis imperatorii libramenta tranſcenderit, ejus ſella in fruſta cedatur, averta vero fiſci viribus deputetur. *Codex Theodoſian.* lib. viii. tit. 5. leg. 47. p. 554. The ſame order occurs alſo in the *Codex Juſtin.* lib. xii. tit. 51, 12, p. 1013, and in Βασιλικων lib. lvii. tit. 17, *edit. Leunclavii*, Baſiliæ 1575, fol. p. 481.

been extremely heavy; and we may conclude from it alſo that every traveller had one of his own. As the ſaddle is here called *ſella*, and as that word occurs oftener at this than at any other period, for the ſeat of the rider, it is probable that it is to be underſtood afterwards as ſignifying a real ſaddle. Beſides, it cannot be denied that where it is uſed, many other little circumſtances are found which may with great propriety be applied to our ſaddles.

Nazarius, in his panegyric on Conſtantine the Great, deſcribing the manner in which the enemy's cavalry were deſtroyed, ſays that, when almoſt lifeleſs, they hung *ſedilibus* *. Lipſius is of opinion that they could have hung in this manner only by ſaddles; but there is reaſon to think that they might lay hold of the coverings of the horſes, if it be certain that theſe were girded to the animals like our ſaddles. Of this, however, there is no proof; for though ſome have aſſerted that *poſtilena* ſignified a girth, that meaning has not been ſupported by ſufficient authorities; and it is more probable that the words *poſtilena, antilena*, and alſo *poſtella* and *antella* †, as well as the girth itſelf, which they are ſuppoſed to expreſs, were not introduced till after the invention of ſaddles. The firſt word occurs in Plautus *; but it perhaps alludes to ſome part of the harneſs of draught-horſes or cattle. Vegetius † diſtinguiſhes ſaddle-horſes from others; and the ſaddle-tree ſeems to be mentioned by Sidonius Apollinaris ‡. In the fifth century ſaddles were made ſo extravagantly magnificent, that a prohibition was iſſued by the emperor Leo I, in which it was ordered that no one ſhould ornament them with pearls or precious ſtones ||. In the ſixth century, the emperor Mauritius required that the ſaddles of the cavalry ſhould have large coverings of fur §. Farther informa-

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* Tunc ire præcipites, labi reclines, ſemineces vacillare, aut moribundi ſedilibus attineri, permixta equorum clade jacere. Cap. 24.

† Antella, quaſi ante ſella, quemadmodum poſtella, quaſi poſt ſella. *Iſidorus*, 20, 16.

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[*] Caſina, i. 37. See Scheffer, De re vehiculari. Francofurti 1671. 4to. p. 125: and Geſneri Theſaur. Ling. Lat.

[†] De arte veterinaria, iv. 6, 2 and 4.

[‡] Alii ſanguine et ſpumis pinguia lupata ſuſcipiunt, alii ſellarum equeſtrium madefacta ſudoribus fulcra reſupinant. Lib. iii. epiſt. 3.

[||] Nulli prorſus liceat, in frenis et equeſtribus ſellis vel in balteis ſuis margaritas et ſmaragdos et hyacinthos aptare poſthac vel inſerere; aliis autem gemmis frena et equeſtres ſellas et balteos ſuos privatos exornare permittimus. *Codex Juſtin.* lib. xi. tit. 11.

[§] Mauricii Ars militaris; edit. Schefferi, lib. i. cap. 2. Χρη τας σιλλας εχειν επισιλια δασεια και μεγαλα. Sellas habere debent cum tegumentis hirſutis et magnis. It is worthy of remark that the Greek word σιλα, ſella, occurs at this period. The ſame word is to be found in the *Tactica* of the emperor Leo, cap. 6, § 9, edit. Meurſii, Lugduni Bat. 1612, 4to. p. 57.

tion reſpecting ſaddles in later times, may be ſeen in Du Cange, who has collected alſo various terms of art to which the invention of ſaddles gave riſe, ſuch as *ſellatores*, ſaddlers, of which the French have made *ſelliers*; *ſellare*, the ſaddle-tree; *ſellare* and *inſellare*, to ſaddle. The ignominious puniſhment of bearing the ſaddle, of which a good account may be found in Du Cange [*], had its origin in the middle ages. The conjecture of Goropius Becanus [†], that the ſaddle was invented by the *Salii*, and named after them, is not worth refutation; as it is perfectly clear that the denomination of *ſella* aroſe from the likeneſs of a ſaddle to a chair; and by way of diſtinction Sidonius and the emperor Leo ſay *ſella equeſtris*; and Jornandes ſays *ſella equitatoria*. Others, perhaps, will paſs no better judgment on a conjecture which I ſhall here venture to give. I conſider it as probable that the invention of ſaddles belongs to the Perſians; becauſe, according to the teſtimony of Xenophon, they firſt began to render the ſeat of the rider more convenient and eaſy, by placing more coverings on the backs of their horſes than was uſual in other countries. Beſides, the horſes of Perſia were firſt made choice of in preference for ſaddle-horſes, on account, perhaps, of their being early trained to

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[*] Under the article *Sellam geſtare*.

[†] Lib. ii. Francicorum, p. 48.

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bear a ſaddle, though Vegetius[*] aſſigns a different reaſon. Of the improvements or alterations made afterwards in ſaddles, I have been able to find no account.

STIRRUPS.

RESPECTING the antiquity of ſtirrups ſeveral men of learning[†] have long ago made reſearches;

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[*] Ad uſum ſellæ Perſis provinciis omnibus meliores præſtat equos, patrimoniorum cenſibus æſtimatos, tam ad vehendum molles et pios inceſſibus, nobilitate prætioſos. *Vegetius, De arte veterin.* iv. 6, 4to. p. 1157.

[†] The principal works in which information is to be found on this ſubject are the following: *Hieron. Magii Miſcellan.* lib. ii. cap. 14; in *Gruteri Lampas ſeu Theſaurus criticus*, tom. ii. p. 1339. *Lipſii Poliorceticon ſive de militia Romana.* Antverpiæ 1605, lib. iii. dial. 7, p. 139. *Pitiſci Lexicon antiquit. Rom.* iii. p. 482. *Salmaſius in Ælii Spart. Antonin. Carac.* p. 163. *G. J. Voſſius de vitiis ſermonis.* Amſtelodami 1695, fol. p. 11. *Polyd. Vergilius de rerum inventoribus.* Lugdun. Bat. 1664, 12mo. lib. iii. cap. 18. *Hugo de militia equeſtri*, i. 4. *Licetus de lucernis*, vi. 30. *Potter, Archæolog. Græca*, iii. 3. *Menagiana*, iv. p. 263. *Brown, Eſſai ſur les erreurs populaires*, ii. p. 162. The hiſtory and art of horſemanſhip, by Richard Berenger; London 1771, 4to. i. p. 64. *Montfaucon, Antiquité expliquée*, tom. iv. lib. 3. cap. 3. p. 77, and Supplement, tom. iv. lib. ii. cap. 4. p. 25. *Le Beau de l'équipement du cavalier légionaire*; in *Mémoires de litterature de l'Académie des Inſcriptions*, tom. xxxix. p. 537.

but as their obſervations are ſcattered through a great variety of books, ſome of which are now ſcarce, and are mingled with much falſehood, it will, perhaps, afford pleaſure to many to find here collected and reduced into order the greater, or at leaſt the moſt important, part of them. In executing this taſk I ſhall aim at more than the character of a diligent collector; for to bring together information of this kind; to arrange it and to make it uſeful, requires no leſs readineſs of thought than the labours of thoſe who aſſume the character of original thinkers, and who imagine that they render others inferior to themſelves when they beſtow on them the appellation of collectors.

We have here a new proof how much people may be deceived, when they ſuppoſe that objects muſt be of great antiquity becauſe they tend to common convenience, and becauſe they appear even ſo indiſpenſably neceſſary and eaſy to have been invented, that one can ſcarcely conceive how they could at any time have been wanting. I cannot, however, deprive our anceſtors of the merit of ingenuity and invention; for they muſt undoubtedly have poſſeſſed no ſmall ſhare of talents and ability, to perform, without the aſſiſtance of our arts, what perhaps would be difficult even for the preſent age to accompliſh. And who knows but there are many things ſtill to be invented the diſcovery of which may give poſterity equal reaſon to reproach us?

Stirrups are uſeful in two points of view; for they not only aſſiſt one in mounting but alſo in riding, as they ſupport the legs of the rider, which otherwiſe would be expoſed to much inconvenience. No traces of any invention for this purpoſe are to be found in the old Greek and Latin writers; and though means to aſſiſt people to get on horſeback were deviſed in the courſe of time, neither ſtirrups nor any permanent ſupport to the legs were for a long period thought of. Nothing that could perform the ſame ſervice as a ſtirrup is to be perceived on ancient coins which exhibit the repreſentation of perſons on horſeback; on ſtatues caſt or formed with the chiſel; or on any remains of ancient ſculpture. In the excellent equeſtrian ſtatues of Trajan and Antoninus, the legs of the rider hang down without any ſupport whatever. Had ſtirrups been in uſe when theſe ſtatues were formed, the artiſts certainly would not have omitted them; and the caſe would have been the ſame with thoſe writers who ſpeak ſo fully of riding, and of the neceſſary equipage and furniture. How is it poſſible that Xenophon, in the two books which he wrote expreſly on horſemanſhip and the art of riding *, where he gives rules

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* Xenophon, De re equeſtri. Joachim Camerarius cauſed a tranſlation

rules for mounting, and where he points out means for aſſiſting old people and infirm perſons, ſhould not have mentioned ſtirrups had he been acquainted with them? And how could they have been paſſed over by Julius Pollux, in his Lexicon[*], where he gives every expreſſion that concerns riding-furniture?

Hippocrates[†] and Galen[‡] ſpeak of a diſeaſe which in their time was occaſioned by long and frequent riding, becauſe the legs hung down without any ſupport. Suetonius[‖] alſo relates that Germanicus, the father of Caligula, by riding often after dinner endeavoured to ſtrengthen his ancles, which had become weak; and Magius explains this very properly by telling us that, as his legs hung down without ſtirrups, they would be

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tranſlation of this book to be printed ſeparately, which ſeems to be little known. It has in the title, *In hoc libello hæc inſunt : De tractandis equis* (This addition is by Camerarius himſelf); *Converſio lib. Xenophontis de re equeſtri*; *et Hiſtoria rei nummariæ.* Tubingæ 1539, 71 pages 8vo.—*Xenophon de magiſterio equitum*, in the edition of Baſle 1555, fol. p. 612.

[*] Lib. i. cap. 11. p. 129.

[†] De aere, locis et aquis, in the Franckfort edition of 1595, fol. ſect. 3. p. 76. The author here ſpeaks in particular of the Scythians, who were always on horſeback; but he afterwards extends his obſervations to all thoſe much addicted to riding.

[‡] Galen. de parvæ pilæ exercitio, cap. 5. De ſanitate tuenda, lib. ii. cap. 11.

[‖] Vita Caligulæ, cap. 3.

continually moved backwards and forwards, and of courſe the circulation of the blood towards thoſe parts would be increaſed.

Neither in the Greek nor Roman authors do we meet with any term that can be applied to ſtirrups; for *ſtaffa*, *ſtapia*, *ſtaphium*, *ſtapha*, *ſtapedium*, *ſtapeda*, and *ſtapes* are words formed in modern times. The laſt, as Voſſius and others ſay, was invented by Franc. Philelphus [*], who was born in 1398 and died in 1481, to expreſs properly a thing unknown to the ancients, and for which they could have no name. The other words are older, as may be ſeen in Du Cange, and appear to be derived from the German *ſtapf*, which is ſtill retained in *fuſs-ſtapf*, a foot-ſtep.

The name of one of the ear-bones, which, on account of its likeneſs to a ſtirrup, has from anatomiſts received the ſame appellation, may occur here to ſome of my readers; and if that expreſſion was known to the ancients it might invalidate my aſſertion. That ſmall bone, however, was firſt remarked at Naples in the year 1546 by John Philip Ingraſſias, a Sicilian, who called it *ſtapes*. To the ancient anatomiſts it was not known [†].

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[*] Reſpecting this Philelphus ſee Fabricii Biblioth. med. et inf. ætatis, vol. v. p. 845.

[†] The hiſtory of this anatomical diſcovery, written by Ingraſſias

Montfaucon is of opinion that it is impoſſible there could be ſtirrups before ſaddles were invented, becauſe the former, at preſent, are faſtened to the latter. This concluſion, however, is not altogether juſt. Stirrups might have been ſuſpended from leather ſtraps girt round the horſe. In mounting it would only have been neceſſary that ſome one ſhould hold faſt the ſtrap on the other ſide; and ſtirrups arranged in this manner would have ſupported the feet of the rider as well as ours. It is certain that mounting on horſeback was formerly much eaſier than it has been ſince the invention of high ſaddles; and it is probable that ſtirrups were introduced ſoon after that period. The arguments which I have here adduced will receive additional force when one conſiders the inconvenient means which the ancients employed to aſſiſt them in getting on horſeback; and which, undoubtedly, they would not have uſed had they been acquainted with ſtirrups.

The Roman manners required that young men and expert riders ſhould be able to vault on horſe-

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graſſias himſelf, may be found in *J. Douglas, Bibliographiæ anatomicæ ſpecimen*; Lugd. Bat. 1734, 8vo. p. 186. This diſcovery was claimed by a perſon named Columbus; but that it belongs to Ingraſſias has been fully proved by Fallopius in his *Obſervat. Anatomicæ.* See *Fallopii Opera*, Francofurti 1606, fol. p. 365. Deus glorioſus ſcit Ingraſſiæ fuiſſe inventum.

back without any aſſiſtance [*]. To accuſtom them to this agility there were wooden horſes in the Campus Martius, on which practitioners were obliged to learn to mount and diſmount, both on the right and the left ſide, at firſt unarmed, and afterwards with arms in their hands [†]. In many public places, particularly highways, ſtones were erected, to which a rider could lead his horſe in order to mount with more facility. Such ſtones Gracchus cauſed to be raiſed [‡]; and they were to be found at many cities, in the ſixteenth century, eſpecially near the council-houſes that they might be uſed by the members of the council, who at that time did not ride in coaches. A convenience of this kind was conſtructed at the Roman gate at Franckfort[*] in 1502; and ſteps for the ſame purpoſe may be ſtill ſeen in many parts of England, where they are employed principally by the ladies[†]. If a certain ludicrous inſcription be ancient, ſuch a ſtone was called *ſuppedaneum*; but this word occurs no where elſe[‡].

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[*] Virg. Æneid. lib. xii. 288.

— — — — Corpora ſaltu
Subjiciunt in equos.

[†] Non tantum a tironibus, ſed etiam a ſtipendioſis militibus, ſalitio equorum diſtricte ſemper eſt exacta. Quem uſum uſque ad hanc ætatem, licet jam cum diſſimulatione, perveniſſe manifeſtum eſt. Equi lignei hieme ſub tecto, æſtate ponebantur in campo. Super hos juniores primo inermes, dum conſuetudine proficerent, demum armati cogebantur aſcendere. Tantaque cura erat, ut non ſolum a dextris, ſed etiam a ſiniſtris et inſilire et deſilire condiſcerent, evaginatos etiam gladios vel contos tenentes. Hoc enim aſſidua meditatione faciebant, ſcilicet ut in tumultu prælii ſine mora aſcenderent, qui tam ſtudioſe exercebantur in pace. *Vegetius De re milit.* i. 18.

[‡] Alios lapides modicis inter ſe intervallis hinc inde ſecundum viam diſpoſuit; quibus equitantes ſine ſubjicibus ephippiariis conſcenderent commodius equos. Ως ειη ραδιως τοις ἵπποις εχουσιν επιβαινειν επ’ αυτων, αναβολεως μη δεομενοις. Plutarchus, Vita C. Gracchi, p. 838.

People of high rank and fortune kept riding ſervants to aſſiſt them in mounting, who were called *ſtratores*[||]. It was uſual alſo to have portable ſtools, which were placed cloſe to the horſe when one wiſhed to mount; and this gave riſe to the barbarous practice of making conquered princes and generals ſtoop down that the victor might more eaſily get on horſeback by ſtepping upon their backs as upon a ſtool. In this ignominious manner was the emperor Valerian treated by Sapor, king of Perſia*. Some horſes alſo were ſo inſtructed that they kneeled until the rider mounted †; and warriors had on their ſpears or lances a ſtep or projection on which they could reſt the foot while they got on horſeback ‡. Winkelmann has deſcribed a cut ſtone in the collection of Baron Stoſch, on which a rider is repreſented in the act of mounting with one foot on the ſtep of his ſpear; and it appears, by an ancient drawing, that a leather loop ‖, into which the foot could be put, was faſtened ſometimes to the lance alſo §.

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[*] Lerſner, Chronike der ſtadt Frankfurt, i. p. 33.

[†] Kalms Reiſe nach dem Nordlichen Amerika, i. p. 34; and ii. p. 355.

[‡] This inſcription may be found in *Thom. Porcacchi Funerali antichi.* Venet. 1574, fol. p. 14.

Dis pedip. ſaxum
Ciuciæ dorſiferæ et cluniferæ,
Ut inſultare et deſultare commodetur,
Pub. Craſſus mulæ ſuæ Craſſæ bene ferenti
Suppedaneum hoc cum riſu poſ.

Here *Dis pedip.* ſeems to be an imitation of *Dis Manibus*; *ſaxum* of the uſual word *ſacrum*: and *bene ferenti* of *bene merenti*.

[||] Lipſius De milit. Romana, p. 140. Pitiſci Lexic. antiq. Theſe ſervants were called alſo αναϐολεις.

Of thoſe who believe that traces of ſtirrups are to be found among the ancients no one has erred more than Galeotus Martius[*], who follows a wrong reading in Lucretius[†], and tranſlates ſtill worſe the words which he adopts. Magius and others conſider as authentic an inſcription, in which ſtirrups are clearly mentioned; and becauſe the letters D. M. *(diis manibus)*, uſual in Pagan inſcriptions, appear at the top, he places it in the firſt century of the Chriſtian æra[‡]. Menage[||], however, and others have already remarked that this inſcription was forged in modern times, and in all probability by Franc. Columna, who lived in the middle of the ſixteenth century, and who ſometimes called himſelf Poliphilus[§]. Gruter, therefore, reckons it among thoſe which ought to be rejected as ſpurious; and of as little authority is the ſilver coin on which the Emperor Conſtantine is repreſented on horſeback with ſtirrups.

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* Eutrop. lib. ix. cap. 6. Victor. epit. 46. Trebell. Pollio, Vita Valeriani. Hofmanni Lexic. artic. Calcandi hoſtium corpora ritus, p. 642.

† Strabo, lib. iii. p. 248, edit. Almel. ſays that the Spaniards inſtructed their horſes in this manner. - - - - Silius Ital. lib. x. 465:

Inde inclinatus collum, ſubmiſſus et armos
De more, inflexis præbebat ſcandere terga
Cruribus.—

See alſo Jul. Pollux, i. 11. Dio Nicæus, in Auguſto.

‡ Lipſius underſtands in this ſenſe what Livy ſays, book iv. chap. 19, of Cornelius Coſſus: Quem cum ictum equo dejeciſſet, confeſtim et ipſe haſta innifus ſe in pedes excepit.

‖ Figures of both may be ſeen in Berenger, tab. [illegible] fig. 3; and tab. 4.

§ By Xenophon this is called απο δορατος αναπηδαν.

Magius quotes from the letters of Jerome, who died in the year 420, the following words: *Se cum quaſdam accepit litteras jumentum conſcenſurum*,§ *jam*

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[*] De promiſcua doctrina, cap. 28.

[†] Lib. v. 1296: Et prius eſt repertum in equi conſcendere coſtas. Martius reads *cloſtris*; and thinks that *cloſtra* is the Greek name for a ladder, which however is κροσσα.

[‡] In this inſcription the following words occur: Caſu deſiliens, pes hæſit ſtapiæ, tractus interii.

[||] Menagiana. Paris 1715, vol. iv. p. 83.

[§] Reſpecting Columna, ſee Fabricii Biblioth. med. et inf. ætatis, i. p. 1131.

pedem habuiſſe in biſtapia. Theſe words have been again quoted by ſeveral writers; and we may readily believe that the author when he wrote them alluded to a ſtirrup. Magius however quotes from memory, and ſays, *ſi memoria non labat.* But theſe words are not to be found in Jerome; and it is probable that Magius may have read them in the works of ſome other author *.

The firſt certain account of ſtirrups, as far as I have been able to learn, is in a book by Mauritius † reſpecting the art of war, where the author ſays, that a horſeman muſt have at his ſaddle two iron *ſcalæ.* This work, commonly aſcribed to the emperor Mauritius, is ſuppoſed to have been written in the end of the ſixth century; and it is not a ſufficient proof to the contrary, that mention is made in it of the Turks, Franks, and Lombards. The firſt were then well known; for Juſtin II ſome time before had concluded a peace with them: the Lombards made themſelves known in the middle of that century; and the Franks had been known much longer *. The ſame words are inſerted by the emperor Leo VI, in his work on tactics, which he wrote in the end of the ninth century †. Still clearer is another paſſage of Mauritius ‡, and of the emperor Leo ||, where it is expreſsly ſaid, that the *deputati*, who were obliged to carry the wounded horſemen from the field, ought to have two ſtirrups on the left ſide of the horſe, one at the fore-part, and the other at the hind-part of the

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* Aquino ſays that ſtirrups are mentioned by Pollux, i. 11. p. 215, 130. In the tranſlation we find alſo: Cum equo inſederis, nequaquam femora ad equi latera comprimas, ſed pedes laxos habeas, ſtanti ſimilis. Stapedes enim magis ad ſtandum quam inſidendum parati ſunt. In the Greek however they do not occur: Και γαρ ἡ ισχυς πλεον επι των εστηκοτων, η επι των καθεζομενων. In the lateſt editions no mention is made of them.

† Mauricii Ars militaris, edita a Joh. Scheffero. Upſaliæ 1664, 8vo. p. 22: Χρη εχειν εις τας σελλας σκαλας σιδηρας δυο.

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[*] Mauric. p. 253: Ὁι Τουρκοι, Φραγγοι, Λογγοβαρδοι. Not however the French, as has been tranſlated in Algem. Welthiſtor. xiii. p. 342. - - Offerhaus, Hiſtor. univerſ. p. 361, 365.

[†] Leonis Tactica, edit. Meurſii, cap. vi. § 10. p. 57: Εις δε τας σελλας δυο σκαλας σιδηρας.

[‡] Lib. ii. cap. 8. p. 64: Ut facile conſcendere deputati equos poſſint ſuos, ſimul atque illi qui vulnerati vel delapſi ſunt ex equis, oportet duos ſtapedes (σκαλας) habere deputatos ad ſiniſtram partem ſellæ, primum ad ipſius curvaturam, ſicut vulgo fieri conſuevit (την μιαν προς τη κουρβῃ, ὡς εθος εστι), alteram ad partem ejus extremam (και την αλλην προς τη οπισθοκουρβῃ); ut ſi duo equum velint conſcendere, hoc eſt, ipſe et alter qui pugnare amplius non poteſt, unus quidem per ſtapedem qui eſt circa curvaturam in eum enitatur, alter vero per eum qui in parte extrema. Κουρβη, κουρβιον is the forepart and οπισθοκουρβη or οπισθοκουρβιον the hind part of the ſaddle-tree. Meurſius thinks that the latter ſignifies what the French call *croupe*; but Scheffer, in his notes on Mauritius, p. 401, 425, ſhews that it is derived from *curvum*. In the *Gloſſis Baſil.* it is ſaid: τα ξυλικια της σελλας κουρβια λεγονται, ὡς καμπυλα: Ligna ſellæ dicuntur curbia, quia ſunt incurva.

[||] Tactica, cap. xii. § 53. p. 150, where the ſame words occur.

ſaddle-tree, that they might each take a diſabled ſoldier on horſeback behind them. That theſe *ſcalæ* were real ſtirrups there ſeems to be no reaſon to doubt; and in my opinion, that word, and other expreſſions of the like kind to be found in later writers, may be underſtood in this ſenſe, eſpecially as concomitant circumſtances appear rather to ſtrengthen than to oppoſe ſuch a conjecture.

Iſidore, in the ſeventh century, ſays *Scanſuæ, ferrum per quod equus ſcanditur*; and alſo *Aſtraba, tabella, in qua pedes requieſcunt* *: both which expreſſions allude to ſtirrups. Leo the Grammarian, in the beginning of the tenth century †, calls them, as

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[*] Both paſſages are quoted by Du Cange from the Gloſſis Iſidori. The latter word ſignified alſo the ſaddle-bow; for Suidas ſays: Αϛραβη, το επι των εφιππιων ξυλον ὅ κρατουσιν ὁι καθεζομενοι. Lignum quod eſt in ephippiis, quod ſeſſores tenent. Alluſion is made to this ſaddle-bow by the emperor Frederic II. *De arte venandi*, ii. 71. p. 152, where he deſcribes how a falconer ſhould mount his horſe: Ponat pedem unum in ſtaffa ſellæ, accipiens *arcum ſellæ* anteriorem cum manu ſua ſiniſtra, ſupra quam jam non eſt falco, poſteriorem autem cum dextra, ſuper quam eſt falco. Nicetas, however, in Manuel. Comnen. lib. ii. p. 63, gives that name to the whole ſaddle; for we are told that the Scythians, when about to croſs a river, placed their arms on the ſaddle (αϛραβην), and laying hold of the tails of their horſes ſwam after them.

[†] Leonis Grammatici Chronographia, printed in the Paris Collection of the Byzantine Hiſtorians, with *Theophanis Chronograph.* 1655, fol. In p. 470, where an account is given of the death of one

as Mauritius does, *ſcalæ.* Suidas, who wrote about the ſame period, ſays, *anaboleus* ſignifies not only a riding-ſervant, who aſſiſts one in mounting, but alſo what by the Romans was called *ſcala* *. As the machine uſed for pulling off boots is named a Jack, becauſe it performs the office of a boy, in the like manner that appellation, which at firſt belonged to the riding-ſervant, was afterwards given to ſtirrups, becauſe they anſwered the ſame purpoſe. Suidas, as a proof of the latter meaning, quotes a paſſage from an anonymous writer, who ſays, that Maſſias, even when an old man, could vault on horſeback without the aſſiſtance of a ſtirrup (*anaboleus*) †. Lipſius thinks that the paſſage is to be found in Appian ‡, reſpecting Maſaniſſa; and in

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one of the murderers of king Michael in the middle of the ninth century, the author ſays, Ιακωβιτζης κυνηγων μετα του βασιλεως εν τῳ Φιλοπατιῳ, του ξιφους αυτῳ εκπεσοντος κατελθων του ἱππου αραι αυτο, του ποδος αυτου μη φθασαντος τῃ γῃ επιβηναι, αλλα του ἱτερου κρατηθεντος εν τῃ σκαλᾳ, θροηθεις ὁ ἱππος διεσυρεν αυτον. - - Jacobitzes inter venandum una cum imperatore ad Philopatium gladium in terram lapſum levaturus ex equo deſiliit; cumque pes ejus terram nondum attigiſſet, altero in penſili ſcandula retento, perterritus equus arrepto curſu per valles et præcipitia traxit et membratim diſcerpſit.

* Αναβολευς, και ἡ παρα Ρωμαιοις λεγομενη σκαλα. Anaboleus etiam ea, quæ Romanis ſcala dicitur.

† Ὁ δε Μασσιας γηρασας ἱππου χωρις αναβολεως επιβαινεν. Maſſias, cum ſenuiſſet, in equum ſine ſcanſorio inſtrumento conſcendit.

‡ De bellis Punicis, edit. Tollii, p. 107.

that caſe the firſt meaning of the word may be adopted. Suidas, according to every appearance, would have been in a miſtake, had he given Maſaniſſa at ſo early a period the Roman *ſcalæ*, with which he could not be acquainted. But that the paſſage is from Appian, and that Maſaniſſa ought to be read inſtead of Maſſias is only mere conjecture; and at any rate Suidas could commit no miſtake in ſaying that the Romans in his time made uſe of *ſcalæ*. Lipſius, however, was not altogether wrong in conſidering this queſtion alone as an inſufficient proof of ſtirrups, becauſe with the ſtill older and more expreſs teſtimony of Mauritius he was unacquainted. Euſtathius, the commentator of Homer [*], ſpeaks in a much clearer manner; but he gives us to underſtand that ſtirrups in his time, that is in the twelfth century, had not become very common. On a piece of tapeſtry of the eleventh century, which Montfaucon cauſed to be engraven [†], the ſaddles of all the horſes appear to have ſtirrups. Aimonius calls them *ſcandilia* [‡], and in the twelfth century the word *ſtaffa* occurs very often, and without doubt in that ſenſe *. In the ages of ſuperſtition, the clergy carried their boundleſs pride to ſuch a length, that they cauſed emperors and kings to hold their ſtirrups when they mounted on horſeback †. It however long continued to be thought a mark of ſuperior dexterity to ride without ſtirrups, at leaſt Phile praiſes Cantacuzenus on this account ‡.

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[*] Αναβολευς ου μονον το σιδηριον ὡ τους ποδας εντιθεντες εφιπποι γινονται τινες, αλλα και ανθρωπος ὃς εις τοιουτο εργον καθυπουργει. Anaboleus non ſolum ferrum illud minutum dicitur, cui pedes imponunt quidam, ut inſcendant commodius; ſed etiam vir ipſe qui ad tale opus adjutat. *Odyſſ.* lib. i. 155.

[†] Monumens de la monarchie Françoiſe, i. tab. 35.

[‡] A quibus et ſella oſtendebatur, quæ dilapſa cum equo fuerat, cujus ſcandilia, quamvis nova, et antelam ſuis impatiens pedibus ipſe diſruperat. *Aimonius De miraculis Sancti Benedicti*, ii. 20.

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* *Epiſtola Alexandri* PP. *apud Rodulſum de Diceto, anno* 1177: Et cum aſcenderemus palefridum noſtrum, ſtaffam tenuit. Idem, an. 1170: Cum rex et archiepiſcopus ſeceſſiſſent in partem, bisque deſcendiſſent, bis ſtapham rex tenuit archiepiſcopo. *Fredericus* II. *De venat.* lib. ii. cap. 71: Deinde ponat pedem ſuum in ſtaffa ſellæ. *From Du Cange.* Stirrups as well as ſpurs occur ſeldom on ſeals in the eleventh century. In the thirteenth they are more frequent. See *P. W. Gerkens Anmerkungen über die ſiegel.* Stendal 1786, 8vo. part. 2. *Heineccius de ſigillis*, p. 205. I ſhall here remark that *Cælius Rhodiginus*, xxi. 31, is miſtaken when he ſays that Avicenna calls ſtirrups *ſubſellares*. *Licetus*, *De lucernis*, p. 786, has proved that this Arabian author ſpeaks only of a covering to ſecure the feet from froſt.

† Inſtances of this pride have been collected by Du Cange in his annotations on Cinnamus, p. 470, and more may be found in his Dictionary, vol. vi. p. 681. When ſteps were not erected on the highways, a metal or wooden knob was affixed to each ſide of the ſaddle, which the rider, when about to mount, laid hold of, and then cauſed his ſervant to aſſiſt him. The ſervants alſo were often obliged to throw themſelves down that their maſter might ſtep upon their back. See *Conſtantin. de ceremoniis aulæ Byzant.* p. 242. A, 6; and p. 405. B, 3; alſo Reiſke in his Annotations, p. 135.

‡ In Cantacuz. edit. Wernſdorfii. Lipſiæ 1768, 8vo. p. 218, who calls ſtirrups κλιμακες, ſcalæ.

HORSE-

HORSE-SHOES.

It can be proved by inconteſtable evidence, that the ancient Greeks and Romans endeavoured, by means of ſome covering, to ſecure from injury the hoofs of their horſes and other animals of burden; but it is equally certain, that our uſual ſhoes, which are nailed on, were invented much later *. We are told by Ariſtotle † and Pliny ‡, that ſhoes were put upon camels in the time of war, and during long journeys; and the former gives them

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* The principal works with which I am acquainted that contain information reſpecting the antiquity of horſe-ſhoes, are the following: *Pancirollus de rebus deperditis*, ii. tit. 16. p. 274. *J. Voſſius in Catulli Opera*. Ultrajecti 1691, 4to. p. 48 *Lexicon militare, auctore Carolo de Aquino*. Romæ 1724, fol. ii. p. 307. Geſner in his Index to *Auctores rei ruſticæ*, art. *Soleæ ferreæ*: *Montfaucon*, *Antiquité expliquée*, iv. liv. 3. p. 79. Le Beau, in *Memoires de l'Académie des Inſcriptions*, vol. xxxix. p. 538. *Archæologia*, or Miſcellaneous tracts relating to antiquity. London 1775, 4to. iii. p. 35 and 39.

† Hiſtor. anim. ii. 6. p. 165, edit. Scaligeri: Ὁ δε πους εϛι κατωθεν σαρκωδης, ὥσπερ και ὁι των αρκτων. Διο και τας εις πολεμον ιουσας ὑποδουσι καρβατιναις, ὅταν αλγησωσιν. Pedis planta carnoſa, velut urſis. Itaque in bellorum expeditionibus carbatinis calceant, cum dolore afficiuntur. They were therefore not uſed at all times, but only when the hoofs began to be injured.

‡ Hiſt. nat. lib. xi. cap. 43: Veſtigio carnoſo ut urſi; qua de cauſſa in longiore itinere ſine calceatu fatiſcunt.

the ſame name as that given to the ſhoes, or rather ſocks or ſoles, of the common people, which were made of ſtrong ox-leather. When the hoofs of cattle, particularly oxen, had ſuſtained any hurt, they were furniſhed with ſhoes, made of ſome plant of the hemp kind [*], wove or plaited together.

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[*] To explain the ancient names of plants, or to give a complete ſyſtematic definition of them, is a taſk of too much difficulty to be comprehended in a note. I ſhall, nevertheleſs, offer here a few obſervations reſpecting *ſpartum*, which may be of ſervice to thoſe who wiſh to carry their reſearches farther. The ancients, and particularly the Greeks, underſtood by that appellation ſeveral ſpecies of plants which could be uſed and manufactured like flax or hemp, and which appear to have been known by thoſe general names. The Greeks however underſtood commonly by *ſpartum* a ſhrub, the ſlender branches of which were woven into baſkets of various kinds, and which produced young ſhoots that could be prepared and manufactured in the ſame manner as hemp; and this plant, as has already been remarked by the old botaniſts, is the *ſpartium junceum*, or Spaniſh broom, which grows wild on dry land, that produces nothing elſe, in the Levant and in the ſouthern parts of Europe. This broom is that deſcribed and recommended in *Comment. inſtituti Bononienſis*, vi. p. 349, and vi. p. 118. The French tranſlator of the papers here alluded to is much miſtaken when he thinks, in *Journal économique*, 1785, Novembre, that the author ſpeaks of the common broom (*ſpartium ſcoparium*) that grows on our moors. Mr. Brouſſonet, in *Memoires d'agriculture, par la Societé de Paris*, 1785, trimeſtre d'automne, p. 127, has alſo recommended the cultivation of the *ſpart. junceum*, under the name of *genet d'Eſpagne*, and enumerated the many uſes to which it may be applied. The people in Lower Languedoc, eſpecially in the neighbourhood of Lodeve,

ther[*]. Theſe indeed were only a ſort of chirurgical bandages; but ſuch ſhoes were given in particular to

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Lodeve, make of it table-cloths, ſhirts and other articles of dreſs. The offal or rind ſerves as firing. This *ſpartum* of the Greeks, or *ſpartium junceum* of the botaniſts, is the ſpecies called by Pliny, book xxxix. chap. 9, *geniſta*, and which he improperly conſiders as the Spaniſh and African *ſpartum*. The latter is certainly the *ſtipa tenaciſſima*, which grows in Spain and Africa, called there at preſent *ſparto* or *eſparto*, and which is ſtill prepared and employed as deſcribed by Pliny, b. xix. c. 2. Baſkets, matraſſes, ſhip-cables, and other ſtrong ropes were made of it; and when this ruſh had been prepared like hemp, it was uſed for various fine works. Even at preſent the Spaniards make of it a kind of ſhoes called *alpergates*, with which they carry on a great trade to the Indies, where they are very uſeful on the hot, rocky and ſandy ſoil. The beſt account of this ruſh may be found in *Cluſii Hiſtor. plantar. rar.* p. 220; in *Löfling's Reiſebeſchreibung*, Berlin 1776, 8vo. p. 169; *Oſbecks Reiſe*, p. 18; the Paris *Schauplatz der künſte*; and the *Encyclopédie methodique des manufactures* par Roland de la Platiere, art. *Sparte*. Whether the ancients made ſhoes for their cattle of the *ſpartium junceum* or the *ſtipa tenaciſſima*, I will not venture to determine. It is probable that the former was uſed by the Greeks, and the latter by the Romans; and it is highly worthy of being here remarked, that in modern times a kind of ſocks for horſes were made of a ſpecies of *ſpartum*, as we learn from John Leo, who ſays: Quoſdam reperias, qui ſportas certoſque funiculos parant, quos Africani equorum pedibus addere ſolent. *J. Leonis Africæ Deſcriptio.* Antverpiæ 1556, 8vo. lib iii. p. 120. The ſame author however ſays expreſsly, p. 96, that common ſhoes of iron were alſo uſed.

[*] Columella, vi. 12, 3: Spartea munitur pes. vi. 15, 1: Spartea calceata ungula curatur. *Vegetius*, i. 26, 3: Spartea calceare curabis.

to mules, which in ancient times were employed more than at preſent for riding; and it appears by two inſtances of immoderate extravagance handed down to us by Roman writers, that people of rank cauſed theſe ſhoes to be made very coſtly. Nero, when he undertook ſhort journeys, was drawn always by mules which had ſilver ſhoes *; and thoſe of his wife Poppæa had ſhoes of gold †. The information of theſe authors however is not ſufficient to enable us to conjecture how theſe ſhoes were made; but from a paſſage of Dio Caſſius we have reaſon to think that the upper part only was formed of thoſe noble metals, or that they were perhaps plaited out of thin ſlips ‡.

Arrian alſo reckons theſe ſoles or ſhoes among

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rabis. See alſo ii. 45, 3. *Galen De alim. facult.* i. 9: Σπαρτος εξ ὁυ πλεκουσι ὑποδηματα ὑποζυγιοις. Is there not ſome reaſon therefore to conclude that this practice was followed not merely in regard to cattle only that were diſeaſed?

* Nunquam carrucis minus mille feciſſe iter traditur, ſoleis mularum argenteis. *Sueton. Vita Neronis*, cap. 30.

† Noſtra ætate Poppæa, conjux Neronis principis, delicatioribus jumentis ſuis ſoleas ex auro quoque induere. *Plin.* lib. xxxiii. cap. 11.—Scheffer, *De re vehiculari*, proves that we are here to underſtand ſhe-mules.

‡ Dio Caſſius, or Xiphilinus, lxii. 28: Τας ἡμιονους τας αγουσας αυτην επιχρυσα σπαρτια ὑποδεισθαι. Mulas quibus agebatur habebat aureis ſoleis calceatas. Commodus cauſed the hoofs of a horſe to be gilded. *Dio Caſſius*, lxxiii. Τας ὁπλας καταχρυσωσας.

the riding-furniture of an aſs *. Xenophon relates that certain people of Aſia were accuſtomed, when the ſnow lay deep on the ground, to draw ſocks over the feet of their horſes, as they would have otherwiſe, he adds, fallen up to the bellies in the ſnow †. I cannot comprehend how their ſinking among the ſnow could, by ſuch means, have been prevented; and I am inclined rather to believe, that their feet were covered in that manner in order to ſave them from being wounded. The Ruſſians, in ſome parts, ſuch as Kamtſchatka, employ the ſame method in regard to the dogs which draw their ſledges, or catch ſeals on the ice. They are furniſhed with ſhoes which are bound round their feet, and which are ſo ingeniouſly made that their claws project through ſmall holes ‡.

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* Commentar. in Epictetum, lib. iii. edit. Coloniæ 1595, 8vo. p. 366: Ὁταν εκεινο οναριον ᾐ, τ'αλλα γινεται χαλιναρια του οναριου σαγματια, ὑποδηματια-- Aſelli ſunt freni, clitellæ, *ferreæ* calces. The laſt word is added by the tranſlator. Ὑποδηματα comes from ὑποδεω ſubligo.

† Xenophon de Cyri Min. expedit. p. 228: Διδασκει ὁ κωμαρχης περι τους ποδας των ἱππων και των ὑποζυγιων, σακκια περιδειν, ὁταν δια της χιονος αγωσιν. Pagi præfectus docuit, ut per nivoſam viam ſacculis equorum et jumentorum pedes obligarent, quod nudis pedibus ingredientes uſque ad ventrem in ipſas nives deſcenderent.

‡ B. F. Hermann, Beytrage zur phyſik. œconomie - - beſonders der Ruſſiſchen Länder. Berlin 1786, 8vo. part i. p. 250. See alſo *Phyſikal. œkonom. biblioth.* xiv. p. 459. The ſame account reſpecting the dogs of Kamtſchatka is given in Cook's laſt Voyage.

The ſhoes of the Roman cattle muſt have been very ill faſtened, as they were ſo readily loſt in ſtiff clay *; and it appears that they were not uſed during a whole journey, but were put on either in miry places, or at times when pomp or the ſafety of the cattle required it; for we are informed by Suetonius, that the coachman of Veſpaſian once ſtopped on the road to put on the ſhoes of his mules †.

The reaſon why mention of theſe ſhoes on horſes occurs ſo ſeldom, is undoubtedly, becauſe, at the time when the before-quoted authors wrote, mules

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* Nunc eum volo de tuo ponte mittere pronum,
Si pote ſtolidum repente excitare veternum,
Et ſupinum animum in gravi derelinquere cœno,
Ferream ut ſoleam tenaci in voragine mula.
Catullus, xvii. 23.

By this paſſage it appears that the ſhoe was of iron, iron wire, or plate-iron.

† Mulionem in itinere quodam ſuſpicatus ad calceandas mulas deſiluiſſe, ut adeunti litigatori ſpatium moramque præberet; interrogavit Quanti calceaſſet? Pactuſque eſt lucri partem. *Sueton. Vita Veſpaſ.* cap. 23. Veſpaſian ſeems to have ſuſpected that his driver had been bribed to ſtop by the way, and that he had done ſo on pretence of ſhoeing his horſes. Had the mules been ſhod, and had the driver had only to rectify ſomething that related to the ſhoe, as our coachmen have when a nail is loſt, or any other little accident has happened, Suetonius would not have ſaid *mulas* but *mulam*. The driver therefore ſtopped for the firſt time on the journey to put on the ſhoes of his cattle, as has been remarked by Geſner.

and aſſes were more employed than horſes, as has been already remarked by Scheffer and others. Artemidorus ſpeaks of a ſhod horſe, and makes uſe of the ſame expreſſion employed in regard to other cattle *. Winkelmann † has deſcribed a cut ſtone in the collection of baron Stoſch, on which is repreſented the figure of a man holding up one foot of a horſe, while another, kneeling, is employed in faſtening on a ſhoe. Theſe are all the proofs of horſes being ſhod among the ancients with which I am acquainted. That they were never ſhod in war, or at any rate, that theſe ſocks were not ſufficient to defend the hoof from injury, ſeems evident from the teſtimony of various authors. When Mithridates was beſieging Cyzicus, he was obliged to ſend his cavalry to Bithynia, becauſe the hoofs of the horſes were entirely ſpoiled and worn out ‡. In the Latin tranſlation, it is added

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* Εδοξε τις ἱππου ὑποδηματα ὑποδεδεσθαι. Εϛρατευσατο και εγενετο ἱππεις. Ουδεν γαρ διεφερεν, ἢ αυτον ἢ τον βαϛαζοντα ἱππον ὑποδεδεσθαι τα ὑποδηματα. Exiſtimavit quis equi calceatum ſe habere. Militavit et factus eſt eques. Nihil enim intererat aut ipſum, aut equum ipſius geſtatorem, calceatum habere. *Artemidori Oneirocritica.* Lutetiæ 1603, 4to. lib. iv. cap. 32.

† Deſcription des pierres gravées du Baron de Stoſch. A Florence 1760. 4to. p. 169.

‡ Τους δ᾽ ἱππους αχρειους ὁι τοτε οντας, και ασθενεις δι᾽ ατροφιαν, και χωλευοντας ἐξ ὑποτριβης, ες Βιθυνιαν περιεπεμπεν. Equos vero tum inutiles et infirmos ob inediam, claudicanteſque ſolearum inopia

added that this was occaſioned by the horſes not having ſhoes; but there are no ſuch words in the original, which ſeems rather to afford a ſtrong proof that in the army of Mithridates there was nothing of the kind. The caſe ſeems to have been the ſame in the army of Alexander; for we are told by Diodorus Siculus, that with uninterrupted marching the hoofs of his horſes were totally broken and deſtroyed *. An inſtance of the like kind is to be found in Cinnamus, where the cavalry were obliged to be left behind, as they had ſuffered conſiderably in the hoofs; an evil, ſays the hiſtorian, to which horſes are often liable †.

From

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inopia detritis ungulis, averſis ab hoſte itineribus miſit in Bithyniam. *Appian. De bello Mithridat.* edit. Tollii, p. 371. The conjecture of Mr. Schweighäuſer, that the reading ought to be ὑπο τριβης, is highly probable.

* Και των μεν ἱππων, δια την συνεχειαν της ὁδοιποριας, τας ὁπλας ὑποτετριφθαι συνεβαινε, των δε ὁπλων τα πλειστα κατεξανθαι. Equorum ungulæ propter itinera nunquam remiſſa detritæ et armorum pleraque abſumpta erant. *Diodor. Sicul.* lib. xvii. 94. edit. Weſſelingii, p. 233. *Vegetius*, i. 56, 28, mentions a ſalve, quo ungulæ nutriantur, et medicaminis beneficio ſubcreſcat quod itineris *attriverat* injuria.

† Παθος γαρ τι τοις αυτων πελμασιν επιγεγονος, ὁ δη τῳ ἱππειῳ επισκεπτειν ειωθε γενει, ἰσχυρως αυτους επιεζεν. Cæteras copias manere in Attalia et equos curare juſſit; nam malum, cui eſt obnoxium equinum genus, plantis pedum acciderat graviterque affecerat. *Joh. Cinnamus De rebus geſtis Imperat.* edit. Tollii, Trajecti ad Rhenum 1652, 4to. lib. iv. p. 194. Vegetius, ii. 58, re-

From what has been ſaid I think I may venture to draw this concluſion, that the ancient Greek and Roman cavalry had not always, or in common, a covering for the hoofs of their horſes, and that they were not acquainted with our ſhoes uſed at preſent, which are nailed on. In the remains of ancient ſculpture, among the ruins of Perſepolis *, on Trajan's pillar, thoſe of Antoninus, Marcus Aurelius, and many others, no repreſentation of them is to be found; and one can never ſuppoſe that the artiſts deſignedly omitted them, as they have imitated with the utmoſt minuteneſs the ſhoes of the ſoldiers, and the nails which faſten on the iron that ſurrounds the wheels of carriages. The objection that the artiſts have not repreſented the ſhoes then in uſe, and that for the ſame reaſon they might have omitted ſhoes ſuch as ours though common, is of no weight; for the former were uſed only very ſeldom; they were not given to every horſe, and when they were drawn over the hoof and made faſt, they had an awkward appearance, which

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commends reſt for horſes after a long journey, on account of their hoofs. "Memineris ungulas excreſcendo renovari, et ideo interpoſitis diebus vel ſingulis menſibus talis cura non deerit, per quam naturæ emendatur infirmitas."

* No traces of them are to be found in the figures given by Chardin, and by Niebuhr in the ſecond volume of his Travels. The latter mentions this circumſtance in particular, and ſays, p. 157, "It appears that the ancient Perſians had no ſtirrups and no proper ſaddle."

which would not have been the caſe with iron ſhoes like thoſe of the moderns. A baſſo-relievo, it is true, may ſtill be ſeen in the Mattei palace at Rome, on which is repreſented a hunting match of Gallienus, and where one of the horſes has a real iron ſhoe on one of his feet. From this circumſtance Fabretti * infers that the uſe of horſe-ſhoes is of the ſame antiquity as that piece of ſculpture; but Winkelmann has remarked, that this foot is not ancient, and that it has been added by a modern artiſt †.

I will readily allow that proofs drawn from an object not being mentioned in the writings of the ancients are of no great importance, and that they may be even very often falſe. For my part, I am of opinion, whatever may be ſaid to the contrary, that Polybius, Xenophon in his Book on riding and horſemanſhip, Julius Pollux in his Dictionary where he mentions fully every thing that relates to horſe-furniture and riding-equipage, and the authors who treat on huſbandry and the veterinary art, could not poſſibly have omitted to take notice of horſe-ſhoes had they been known at thoſe periods when they wrote. Can we ſuppoſe that writers would be ſilent reſpecting the ſhoeing of

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* De columna Trajani, cap. 7.

† Pierres gravées du Baron de Stoſch, p. 169.

horſes, had it been practiſed, when they ſpeak ſo circumſtantially of the breeding and rearing of theſe animals, and preſcribe remedies for the diſeaſes and accidents to which they are liable? On account of the danger which ariſes from horſes being badly ſhod, the treatment of all thoſe diſorders to which they are incident has been committed to farriers; and is it in the leaſt probable, that this part of their employment ſhould have been entirely forgotten by Vegetius and the reſt of the ancients, who ſtudied the nature and maladies of cattle? They indeed ſpeak ſeldom, and not very expreſsly, of the ancient ſhoes put on horſes; but this is not to be wondered at, as they had little occaſion to mention them, becauſe they gave riſe to no particular infirmity. Where they could be of utility they have recommended them; which plainly ſhews that the uſe of them was not then common. Geſner remarks very properly, that Lycinus, in Lucian, who was unacquainted with riding, when enumerating the many dangers to which he might be expoſed by mounting on horſeback, ſpeaks only of being trod under the feet of the cavalry, without making any mention of the injury to be apprehended from iron ſhoes. To be ſenſible, however, of the full force of this argument, one muſt read the whole paſſage *. Many of the ancient hiſtorians

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* *Navigium ſeu Vota.* Nunquam equum ullum aſcendi ante hunc

hiſtorians alſo, when they ſpeak of armies, give an account of all thoſe perſons who were moſt neceſſary in them, and of the duties which they performed; but farriers are not even mentioned. When it was neceſſary for the horſes to have ſhoes, each rider put them upon his own; no perſons in particular were requiſite for that ſervice: but had ſhoes, ſuch as thoſe of the moderns, been then in uſe, the aſſiſtance of farriers would have been indiſpenſable.

As our horſe-ſhoes were unknown to the ancients, they employed the utmoſt care to procure horſes with ſtrong hoofs*, and for the ſame reaſon they tried every method poſſible to harden the hoofs and to render them more durable. Precepts for this purpoſe may be found in Xenophon †,

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hunc diem. Proinde metuo, tubicine claſſicum intonante, decidens ego in tumultu a tot ungulis conculcer, aut etiam equus ferocior exiſtens, arrepto freno in medios hoſtes efferat me, aut denique oporteat me alligari ephippio, ſi manere ſuper illud debeam, frenumque tenere.—Had ſtirrups been then in uſe, he would have been expoſed alſo to the danger of being dragged along by the heels. - When I extracted the above paſſage, I had no edition of Lucian at hand but that of Baſle, 1563, 12mo. It may be found there, vol. ii. p. 840.

* The prophet Iſaiah, chap. v. ver. 28, to make the enemy appear more terrible, ſays, "The hoofs of their horſes ſhall be counted like flint;" and Jeremiah, chap. xlvii. v. 3, ſpeaks of the noiſe made by the horſes ſtamping with their hoofs. See *Bochart. Hierozoic.* i. p. 160.

† De re equeſtri, cap. iv, p. m. 599.

Vegetius *, and other authors. It indeed appears wonderful to us, that the uſe of iron ſhoes ſhould have remained ſo long unknown; but it was undoubtedly a bold attempt to nail a piece of iron, for the firſt time, under the foot of a horſe; and I have no doubt that there are many perſons at preſent, who, had they never ſeen ſuch a thing, would doubt the poſſibility of it if they heard it mentioned. Horſe-ſhoes, however, are not abſolutely neceſſary; horſes in many countries are ſcarce, and in ſome they are not ſhod even at preſent. This is ſtill the caſe in Ethiopia, in Japan, and in Tartary †. In Japan, ſhoes, ſuch as thoſe of

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[*] Lib. i. cap. 56, 2; and cap. 28 and 30; alſo Lib. ii. cap. 57 and 58.

[†] J. Ludolphi Hiſt. Æthiop. i. cap. 10, and his Commentarium, p. 146. *Thevenot*, vol. ii. p. 113. *Voyage de Le Blanc*, part. ii. p. 75, 81. *Lettres édifiantes*, vol. iv. p. 143. *Tavernier*, vol. i. c. 5. *Hiſt. gen. des voyages*, vol. iii. p. 182. *Kæmpfer, Hiſtoire du Japon*; Amſterd. 1732, 3 vol. 12mo. ii. p. 297. The paſſage of the laſt author, where he mentions the articles neceſſary for a journey in Japan, is worthy of notice: " Shoes for the ſervants and for the horſes. Thoſe of the latter are made of ſtraw, and are faſtened with ropes of the ſame to the feet of the horſes inſtead of iron ſhoes, ſuch as ours in Europe, which are not uſed in this country. As the roads are ſlippery and full of ſtones, theſe ſhoes are ſoon worn out, ſo that it is often neceſſary to change them. For this purpoſe thoſe who have the care of the horſes carry always with them a ſufficient quantity, which they affix to the portmanteaus. They may however be found in all the villages, and poor children who beg on the road, even offer

of the ancients, are uſed. Iron ſhoes are leſs neceſſary in places where the ground is ſoft and free from ſtones; and it appears to me very probable, that the practice of ſhoeing became more common as the paving of ſtreets was increaſed. There were paved highways indeed at a very early period, but they were a long time ſcarce, and were to be found only in opulent countries. But when roads covered with gravel were almoſt every where conſtructed, the hoofs of the horſes would have ſoon been deſtroyed without iron ſhoes, and the preſervatives before employed would have been of very little ſervice.

However ſtrong I conſider theſe proofs, which ſhew that the ancients did not give their horſes ſhoes ſuch as ours, I think it my duty to mention and examine thoſe grounds from which men of learning and ingenuity have affirmed the contrary.

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offer them for ſale, ſo that it may be ſaid there are more farriers in this country than in any other; though, to ſpeak properly, there are none at all."

[Almoſt the ſame account is given by Dr. Thunberg, a later traveller in Japan. "Small ſhoes or ſocks of ſtraw," ſays he, "are uſed for horſes inſtead of iron ſhoes. They are faſtened round the ankle with ſtraw ropes, hinder ſtones from injuring the feet, and prevent the animal from ſtumbling. Theſe ſhoes are not ſtrong; but they coſt little, and can be found every where throughout the country." *Reſa uti Europa, Africa, Aſia*, af Carl Peter Thunberg. Upſala 1791, vol. iii. p. 172. Shoes of the ſame kind, the author informs us, are worn by the inhabitants. TRANS.]

trary. Voſſius lays great ſtreſs, in particular, upon a paſſage of Xenophon, who, as he thinks, recommends the preſervation of the hoofs by means of iron. Geſner, however, has explained the words uſed by that author ſo clearly as to leave no doubt that Voſſius judged too raſhly. Xenophon * only gives directions to harden the hoofs of a horſe, and to make them ſtronger and more durable; which is to be done, he ſays, by cauſing him to walk and to ſtamp with his feet in a place covered with ſtones. He deſcribes the ſtones proper for this purpoſe; and that they may be retained in their poſition, he adviſes that they ſhould be bound down with cramps of iron. The word which Voſſius refers to the hoofs, alludes without doubt to the ſtones which were to be kept together by the above means. Xenophon, in another work, repeats the ſame advice †, and ſays, that experience will

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* Exteriore quidem parte ſui ſtabulum ita rectiſſime ſe habebit et pedes equi ampliabit, ſi rotunda ſaxa palmari magnitudine, pondere libræ, quam multa quatuor aut quinque plauſtra vehere poſſint, effuſe dejiciantur et ferro includantur, ne a ſe diſcedant. Ac ſuper hæc inductus equus quaſi in lapidoſa via ſingulis diebus aliquantiſper gradiatur. Nam ſive deſtringatur, ſeu a muſcis pungatur, uti ungulis illum non ſecus quam ſi vadat, neceſſe eſt. Etiam teſtudinem pedis hoc modo effuſi lapides ſolidant. *De re equeſtri*, p. 599.

† Quemadmodum autem fiant pedes equorum robuſtiſſimi, ſi quis habet faciliorem et promptiorem exercitationem, eam ſequatur; ſin minus, illud uſu doctus faciendum ſuadeo, ut conjectis confuſe

will ſoon ſhew how much the hoofs will be ſtrengthened by this operation.

Voſſius conſiders alſo as an argument in his favour the expreſſions uſed by Homer and other poets when they ſpeak of iron-footed and brazen-footed horſes, loud-ſounding hoofs, &c.* and is of opinion that ſuch epithets could be applied only to horſes that had iron ſhoes. But if we recollect that hard and ſtrong hoofs were among the properties of a good horſe, we ſhall find that theſe expreſſions are perfectly intelligible without calling in the aſſiſtance of modern horſe-ſhoes. Xeno-

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confuſe ex via lapidibus plus minus unius libræ, hic collocetur equus interim dum fricatur a præſepi ſolutus. Ingredi enim per lapides illos equus non deſiſtet, neque cum detergetur, neque cum calcaribus additis incitabitur. Qui autem periculum fecerit, iis quæ a me dicuntur fidem habebit, equique pedes rotundos effectos animadvertet (στρογγυλους τους ποδας του ἱππου οψεται). *Hipparch.* p. m. 611.

[*] Homer. Iliad. lib. xiii. 23, and lib. viii. 41: χαλκοποδες ἱπποι. Iliad. v. 772: ὑψηχεες ἱπποι. Iliad. xi. 152: εριγδουποι ποδες ἱππων. Dacier, Polydore Vergil, and Euſtathius underſtand the words which immediately follow the laſt paſſage as if the horſes beat the ground or duſt with ſome metal; δηιοωντες alludes however to the riders, ἱππεις, or even the πεζοι mentioned a little before, and not to the horſes. The meaning therefore is, that the Greeks ſtruck the Trojans with the metal weapons which they had in their hands. Aquino, whoſe opinion Voſſius approves, cites on this occaſion the ἱππους χαλκοκροτους of Ariſtophanes in his *Equites*, ver. 549.

phon employs the like compariſons free from poetical ornament, and explains them in a manner ſufficiently clear. The hoofs, ſays he, muſt be ſo hard that when the horſe ſtrikes the ground, they may reſound like a cymbal [*]. Euſtathius, the ſcholiaſt of Ariſtophanes, and Heſychius [†], have alſo explained theſe expreſſions as alluding to the hardneſs and ſolidity of the hoofs. Of the ſame kind is the *equi ſonipedes* of the Roman poet [‡]; and the ſtags and oxen with metal feet [||], mentioned in fabulous hiſtory, which undoubtedly were not ſhod. Epithets of the like nature were applied by the poets to perſons who had a ſtrong voice [§].

Le Beau quotes a paſſage of Tryphiodorus, which on the firſt view ſeems to allude to a real horſe-ſhoe. This author, where he ſpeaks of the conſtruction of the Trojan horſe, ſays that the artiſt did not forget the metal or iron on the hoofs[*]. But ſuppoſing it true, that the author here meant real ſhoes, that would be no proof of their being known at the time of the Trojan war, and we could only be authoriſed to allow them the ſame antiquity as the period when the poet wrote. That however is not known. According to the moſt probable conjectures, it was between the reign of Severus and that of Anaſtaſius, or between the beginning of the third and the ſixth century. Beſides, the whole account may be underſtood as alluding to the ancient ſhoes. At any rate, it ought to be explained in this manner till it be proved by undiſputed authorities that ſhoes, ſuch as thoſe of the moderns, were uſed in the time of the above poet.

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[*] In the beginning of the book: ὥσπερ κυμβαλον ψοφει προς τῷ δαπεδῳ. Theſe words are quoted by Pollux, i. 188. p. 118.

[†] The laſt-mentioned author explains χαλκοποδας by ισχυροποδας. Pindar, Pyth. iv. 402. p. 239, gives the horſes ὁπλας χαλκειας, ungulas æreas. Stephanus in his Dictionary explains χαλκοπους very improperly in the following manner: Æreos habens pedes, ſeu cujus pedes æreis ſoleis ferrati ſunt.

[‡] Virg. Æneid. lib. iv. 135. lib. xi. 600, 638.

[||] Auſonius: Vincunt æripides ter anno Neſtore cervi. Virg. Æneid. lib. vi. 803. Ovid. Heroid. ep. xii. 93, and Metamorph. lib. vii. 105. Apollonius, lib. iii. 228.

[§] Iliad. lib. v. 785. Stentor is there called χαλκεοφωνος. Iliad lib. xviii. 222, Achilles is ſaid to have had a brazen voice. Virg. Georg. lib. ii. 44: ferrea vox.

Voſſius aſſerts that he had in his poſſeſſion a Greek manuſcript on the veterinary art, in which there were ſome figures, where the nails under the feet of the horſes could be plainly diſtinguiſhed. But we are ignorant whether the manuſcript or the figures ſtill exiſt, nor is the antiquity of either of them known. It is probable that ſhoes were given to the horſes by a modern tranſcriber, in the ſame manner as another put a pen into the hand of Ariſtotle.

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[*] *Tryphiodori Ilii excidium*, publiſhed in octavo at Oxford in 1739, by Merrick, with a free poetical Engliſh tranſlation, and the Latin tranſlation of Friſchilin. *The Deſtruction of Troy*, v. 86, p. 14:

Ου' μεν επι κνημησιν αχαλκέες εξεχον ὅπλαι,
Μαρμαρεης δ' ελικεσσι κατεσφηκωντο χελωνης,
Απτομεναι πεδιοιο μογις κρατερωνυχι χαλκῳ.

Ungula quin etiam ferro non abſque micabat,
Crura feri ſubter ; ſed vincta volumine conchæ
Vix ſola tangebat validi munimine ferri.

In my opinion we muſt expect to meet with the firſt certain information reſpecting horſe-ſhoes in much later writers than thoſe in which it has been hitherto ſought for, and ſuppoſed to have been diſcovered. Were it properly aſcertained that the piece of iron found in the grave of Childeric, was really a part of a horſe-ſhoe, I ſhould conſider it as affording the firſt information on this ſubject, and ſhould place the uſe of modern horſe-ſhoes in the eighth century. But I do not think that the certainty of its being ſo is eſtabliſhed in a manner ſo complete as has hitherto been believed. Thoſe who affirmed that this piece of iron had exactly the ſhape of a modern horſe-ſhoe, judged only from an engraving, and did not perceive that the figure was enlarged *. The piece of iron itſelf, which ſeemed

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* The firſt figure may be found in *Anaſtaſis Childerici, Francorum regis, ſive Theſaurus ſepulchralis Tornaci Nerviorum effoſſus; auctore J. J. Chifletio*. Antverpiæ 1655, 4to. p. 224. The whole deſcription is as follows: Ferrea ſolea; ſed ita rubigine abſumpta,

ed to have four holes on each ſide, was ſo conſumed with ruſt, that it broke while an attempt was made to clear them; and undoubtedly it could not be ſo perfect as the engraving.

The account given by Pancirollus induced me to hope that I ſhould find in Nicetas undoubted evidence of horſe-ſhoes being uſed about the beginning of the thirteenth century; but that writer has deceived both himſelf and his readers, by confining himſelf to the tranſlation. After the death of Henry Baldwin, the Latins threw down a beautiful equeſtrian ſtatue of braſs, which ſome believed to be that of Joſhua. When the feet of the horſe were carried away, an image was found under one of them which repreſented a Bulgarian, and not a Latin as had been before ſuppoſed. Such is the account of Nicetas; but Pancirollus miſrepre-

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abſumpta, ut dum veruculo clavorum foramina (quæ utrimque quaterna erant) purgare leviter tentarem, ferrum putre in fragmenta diffiluerit, et ex parte dumtaxat hic repræſentari potuerit. Montfaucon, in *Les monumens de la monarchie Françoiſe*, Paris 1729, 4 vol. fol. i. p. 16. tab. 6, has given alſo an engraving of it, and ſays below: Solea ferrea equi regii hic tota repræſentatur, etſi pars ejus tantum reperta ſit; ſed ex illa parte totius formam excipere haud difficile fuit. Modicæ magnitudinis equus erat.— Childeric died in the year 481. In 1653 his grave was diſcovered at Tournay, and a gold ring with the royal image and name found in it afforded the ſtrongeſt proof that it was really the burying place of that monarch. In the year 1665, theſe antiquities were removed to the king's library at Paris.

ſents it entirely; for he ſays that the image was found under a piece of iron torn off from one of the feet of the horſe, and which he conſiders therefore as a horſe-ſhoe. The image, however, appears to have repreſented a vanquiſhed enemy, and to have been placed in an abject poſture under the feet of the ſtatue (a piece of flattery which artiſts ſtill employ), and to have been ſo ſituated that it could not be diſtinctly ſeen till the whole ſtatue was broken to pieces. Hence perhaps aroſe the vengeance of the Latins againſt the ſtatue, becauſe that ſmall figure was by ſome ſuppoſed to repreſent one of their nation *.

As it appeared to me that the words uſed by ancient authors to expreſs ſhoes † occurred leſs frequently in the writers of later periods, I conjectured that modern horſe-ſhoes, in order that they ſhould be diſtinguiſhed from the ancient ſhoes, might have received a particular new name, under which I had never found them mention-

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* The whole account may be found at the end of the Annals, in the Paris edition by Fabrotti 1647, fol. p. 414: Αναμοχλευσαντες τοινυν ῥαιστηρσι το πελμα το ἱππειον, ανθροπομορφον ἑυρισκουσιν ινδαλμα ὑποκειμενον. Proinde malleis equi calce revulſa, humanam ſubtus imaginem reperiunt, quæ majori ex parte Bulgarum aliquem repræſentabat, clavo transfixam, et plumbo undique cinctam; non autem Latinum referebat, quemadmodum jam diu a multis ferebatur.

† The words ὑποδηματα and *ſoleæ*.

ed. In the courſe of my reſearches, therefore, I thought of the Greek word *ſelinaia*, the meaning of which I had before attempted to explain; and I am now fully convinced that it ſignifies horſe-ſhoes, ſuch as thoſe uſed at preſent, as has been already remarked by others. As far as I know, that word occurs, for the firſt time, in the ninth century, in the works of the Emperor Leo *: and this antiquity of horſe-ſhoes is, in ſome meaſure, confirmed by their being mentioned in the writ-

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* Leonis Tactica, v. 4. p. 51.—In the paſſage where he names every thing belonging to the equipage of a horſeman, he ſays: πεδικλα σελεναια σιδηρα μετα καρφιων αυτων. I ſhall here firſt remark, that after πεδικλα there ought to be a comma, for by that word is meant the ropes with which ſaddled horſes were faſtened. Du Freſne or Du Cange, in *Gloſſarium ad Scriptores mediæ et infimæ Græcitatis*, Lugd. 1688, fol. p. 1139, ſays πεδικλουν ſignifies *to bind*. See likewiſe Scheffer's Annotations on *Mauricii Ars militaris*, p. 395. The tranſlator alſo has improperly ſaid: Pedicla, id eſt calceos lunatos ferreos cum ipſis carphiis. Καρφια means *nails*, as Du Freſne has proved by ſeveral inſtances, and here *horſe-ſhoe nails*. The word may be found for the ſecond time in the tenth century, in the *Tactica* of the Emperor Conſtantine, where the whole paſſage, however, is taken from Leo without the leaſt variation; ſo that we may ſuppoſe Conſtantine underſtood it in the ſame ſenſe as Leo. It is uſed, for the third time, by the ſame emperor, twice in his book on the Ceremonial of his own court. In p. 265, where he ſpeaks of the horſes (τα ἱππαρια) which were to be procured for the imperial ſtable, theſe, he ſays, were to be provided with every thing neceſſary, and to have alſo σελιναια. In page 267 it is ſaid further, that a certain number of pounds of iron ſhould be given out from the imperial ſtores to make σελιναια, and other horſe-furniture. The ſame word is uſed a fourth time by Euſtathius, who wrote in the twelfth century, in his Commentary on Homer;

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mer: Χαλκον δε νυν λεγει τα σεληναια ὑπο τοις ποσι των ἱππων, ὅις διακοπτονται εις πλεον τα πατουμενα. See *Iliad.* lib. xi. 152. Though I do not believe that Homer had the leaſt idea of horſe-ſhoes, I am fully convinced that Euſtathius alludes to them by that word. This commentator has explained very properly various paſſages of the like kind in Homer; but he ſeems here, as was the caſe ſometimes with his poet himſelf, to have been aſleep or ſlumbering.

When one conſiders that the σιλιναια, or σεληναια, belonged to horſe-furniture; that they were made of iron; that, as Euſtathius ſays, they were placed under the hoofs of the horſes; that the word ſeems to ſhew its derivation from the moon-like form of ſhoes, ſuch as thoſe uſed at preſent; and laſtly, that nails were neceſſary to theſe σελιναια; I think we may venture to conclude, without any fear of erring, that this word was employed to ſignify horſe-ſhoes of the ſame kind as ours, and that they were known, if not earlier, at leaſt in the ninth century.

Moſt of thoſe who have examined and illuſtrated the Greek language of modern times agree with me in this opinion. Du Freſne explains σελιναια as follows: Equorum ferrei calcei, a lunulæ forma, quam referunt. Lange, in his *Philologia Barbaro-Græca*, Noribergæ 1708, 4to. p. 173, tranſlates it *calceus ferreus*. Meurſius alone, in *Gloſſarium Græco-Barbarum*, Lugd. Batav. 1614, 4to. p. 494, thinks differently, and maintains that σελιναιον is the ſame as σιλοπουγſιον, ſellipungium, which ſignifies a portmanteau. The grounds on which he reſts his aſſertion are, that the Emperor Leo in his *Tactica* uſes once the words σκεροσοκκα πεδικλα, σελιναια σιδηρα; but that in another place, making uſe of the ſame expreſſion, he ſubſtitutes σελοπουγſιον inſtead of σελιναια. This concluſion, however, is not juſt, as the Emperor may have had his reaſons for mentioning horſe-ſhoes once without the portmanteau, and

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ings of Italian, Engliſh and French authors of the ſame century. When Boniface marquis of Tuſcany, one of the richeſt princes of his time, went to meet Beatrix, his bride, mother of the well-known Matilda, about the year 1038, his whole train were ſo magnificently decorated, that his horſes were not ſhod with iron but with ſilver. The nails even were of the ſame metal; and when any of them dropped out they belonged to thoſe who found them. The marquis appears to have imitated Nero; but this anecdote may be only a fiction. It is related by a cotemporary writer; but, unfortunately, his account is in verſe; and the author, perhaps ſenſible of his inability to make his ſubject ſufficiently intereſting by poetical ornaments, availed himſelf of the licence claimed by poets to relate ſomething ſingular and uncommon *. However this may be, it is certain that the

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for again mentioning the latter without the former. Beſides, according to the explanation of Meurſius, Leo muſt have ſpoken of an iron portmanteau, which can hardly be ſuppoſed.

* — — — Qui dux cum pergeret illo,
Ornatus magnos ſecum tulit, atque caballos,
Sub pedibus quorum chalibem non ponere ſolum
Juſſerat; argentum ſed ponere, ſit quaſi ferrum:
Eſſe repercuſſum clavum voluit quoque nullum,
Ex hoc ut gentes poſſent reperire quis eſſet.
Cornipides currunt, argentum dum reſilit, tunc
Colligitur paſſim, paſſim reperitur in agris
A populo terræ, teſtans quod dives hic eſſet.

Vita Mathildis, a Donizone ſcripta, cap. 9.

the ſhoes of the horſes muſt have been faſtened on with nails, otherwiſe the author could not have mentioned them.

Daniel, the hiſtorian, ſeems to give us to underſtand that in the ninth century horſes were not ſhod always, but only in the time of froſt, and on other particular occaſions *. The practice of ſhoeing appears to have been introduced into England by William the Conqueror. We are informed that this ſovereign gave the city of Northampton, as a fief, to a certain perſon, in conſideration of his paying a ſtated ſum yearly for the ſhoeing of horſes †; and it is believed that Henry de Ferres, or de Ferrers, who came over with William, and whoſe deſcendants ſtill bear in their arms ſix horſe-ſhoes, received that ſurname becauſe he was entruſted with the inſpection of the farriers ‡. I

This life of Matilda may be found in *Leibnitii Scriptores Brunſvicenſes*, vol. i. p. 629; but the fulleſt and correcteſt edition is in *Muratori Rerum Italicarum Scriptores*. Mediolani 1724, fol. vol. v. p. 353.

* La gelée qui avoit ſuivi (les pluyes de l'automne) avoit gaſté les pieds de la pluſpart des chevaux, qu'on ne pouvoit faire ferrer dans un pais devenu tout d'un coup ennemi, lorſqu'on y penſoit le moins. *Hiſtoire de France*, vol. i. p. 566. The author here ſpeaks of the cavalry of Louis le Debonnaire.

† Dugd. Bar. i. 58. ex Chron. Bromtoni, p. 974, 975, Blount's Tenures, p. 50. The latter book I have not ſeen: I quote it only from the *Archæologia*.

‡ Brook's Diſcovery of errors in the Catalogue of the nobility, p. 198.

ſhall here obſerve, that horſe-ſhoes have been found, with other riding-furniture, in the graves of ſome of the old Germans and Vandals in the northern countries; but the antiquity of them cannot be aſcertained *.

FLOATING OF WOOD.

THE conveying of wood in floats is an excellent invention; as countries deſtitute of that neceſſary article can be ſupplied by water carriage, not only with timber for building and other uſeful purpoſes, but alſo with fire-wood. The former is either puſhed into the water in ſingle trunks, and ſuffered to be carried along by the ſtream, or a number of planks are ranged cloſe to each other in regular order, bound together in that manner, and ſteered down the current, as boats are, by people accuſtomed to ſuch employment. The firſt method is that moſt commonly uſed for fire-wood. Above floats of the ſecond kind a load of ſpars, deals, laths, pipe-ſtaves, and other timber, is generally placed;

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* Beckmann in Beſchreibung der Mark Brandenburg, Berlin 1751, 2 vol. fol. i. p. 401, mentions an old ſhoe found in a grave, the holdfaſts of which did not project downwards but upwards. Arnkul in his *Heidniſchen alterthümern* ſpeaks alſo of a horſe-ſhoe found near Kiel.

placed; and with theſe floaters will truſt themſelves on broad and rapid rivers, whereas fire-wood is fit to be tranſported only on rivulets or ſmall ſtreams; and ſometimes canals are conſtructed on purpoſe [*]. However ſimple the invention of floating fire-wood may be, I conſider the other method as the oldeſt; and I confeſs that I do not remember to have found in ancient authors any information reſpecting the former. Fire-wood was, indeed, not ſo ſcarce formerly in the neighbourhood of large cities as it is at preſent. Men eſtabliſhed themſelves where it was abundant; and they uſed it freely, without thinking on the wants of poſterity, till its being exhauſted rendered it neceſſary for them to import it from diſtant places. It is probable that the moſt ancient mode of conſtructing veſſels for the purpoſe of navigation gave riſe to the firſt idea of conveying timber for building in the like manner; as the earlieſt ſhips or boats were nothing elſe than rafts, or a collection of beams and planks bound together, over which were placed deals. By the Greeks they were called *ſchedai*, and by the Latins *rates*; and it is known from the teſtimony of many writers, that the ancients ventured out to ſea with them on piratical expeditions as well as to carry on commerce; and that after the invention of ſhips they were ſtill retained for the tranſportation of ſoldiers and of heavy burdens[*].

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[*] Thoſe who are deſirous of particular information reſpecting every thing that concerns the floating of wood may read *Bergius, Polizey- und Cameralmagazin*, vol. iii. p. 156; *Krunitz, Encyclopedie*, vol. xiv. p. 286; and the *Forſtmagazin*, vol. viii. p. 1. To form an idea of the many laborious, expenſive and ingenious eſtabliſhments and undertakings which are often neceſſary in this buſineſs, one may peruſe *Memoire ſur les travaux qui ont rapport à l'exploitation de la mâture dans les Pyrenées.* Par M. Leroy. Londres et Paris 1776, 4to. of which I have given ſome account in *Phyſikaliſch-ökonom. bibliothek*, vol. ix. p. 157. So early as the time of cardinal Richelieu the French began to bring from the Pyrenées timber for maſts to their navy; but as the expence was very great, the attempt was abandoned, till it was reſumed in the year 1758 by a private company, who entered into a contract with the miniſter for ſupplying the dock-yards with maſts. After 1765 Government took that buſineſs into their own hands; but it was attended with very great difficulties.

The above conjecture is confirmed by the oldeſt information to be found in hiſtory reſpecting the conveyance by water of timber for building. Solomon entered into a contract with Hiram, king of Tyre, by which the latter was to cauſe cedars for the uſe of the temple to be cut down on the weſtern ſide of mount Lebanon, above Tripoli, ad to be floated to Jaffa. The words at leaſt employed by the Hebrew hiſtorian, which occur no where elſe, are underſtood as alluding to the conveyance of timber in floats; and this explanation is conſidered by Mr. Michaelis as probable. At preſent no ſtreams run from Lebanon to Jeruſalem; and the Jordan, the only river in Paleſtine that could bear floats, is at a great diſtance from the cedar foreſt. The wood, therefore, muſt have been brought along the coaſt by ſea to Jaffa [*]. In this

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[*] Plinius, lib. vi. cap. 56: Nave primus in Græciam ex Ægypto Danaus advenit; antea ratibus navigabatur, inventis in Mari Rubro inter inſulas a rege Erythra. *Strabo*, lib. xvi. relates the ſame thing, and calls theſe rafts σχεδαι. *Feſtus*, p. 432: Rates vocant tigna colligata, quæ per aquam aguntur, quo vocabulo interdum etiam naves ſignificantur. See *Scheffer*, *De militia navali veterum*, lib. i. cap. 3; and *Pitiſci Lexicon Antiquitat. Rom.* art. *Rates*

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[*] "My ſervants ſhall bring them down from Lebanon unto the ſea: and I will convey them by ſea in floats unto the place that thou ſhalt appoint me." 1 *Kings*, chap. v. ver. 9. "And we will cut wood out of Lebanon, as much as thou ſhalt need: and we will bring it to thee in floats by ſea to Joppa: and thou ſhalt carry it up to Jeruſalem." 2 *Chronicles*, chap. ii. v. 16. Pocock thinks that the wood was cut down near Tyre. The accounts given by travellers of mount Lebanon, and the ſmall remains of the ancient foreſts of cedar, have been collected by Buſching in his Geography.

[The following is the account given of theſe cedars by the abbé Binos, who viſited them in the year 1778. "Here," ſays he, "I firſt diſcovered the celebrated cedars, which grow in an oval plain, about an Italian mile in circumference. The largeſt ſtand at a conſiderable diſtance from each other, as if afraid that their branches might be entangled, or to afford room for their tender ſhoots to ſpring up, and to elevate themſelves alſo in the courſe of time. Theſe trees raiſe their proud ſummits to the height of ſixty, eighty, and a hundred feet. Three or four, when young, grow up ſometimes together, and form at length, this manner is the account underſtood by Joſephus; but although he aſſures us that he gives the letters of both the kings as they were at that time preſerved in the Jewiſh and Tyrian annals, it is certain that they are ſpurious; and that he took the whole relation from the ſacred books of the Jews which are ſtill extant, as he himſelf tells us in the beginning of his work [*].

An old tradition prevailed that the city Camarina, on the ſouthern coaſt of Sicily, was built of

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length, by uniting their ſap, a tree of a monſtrous thickneſs. The trunk then aſſumes generally a ſquare form. The thickeſt which I ſaw might be about thirty feet round; and this ſize was occaſioned by ſeveral having been united when young. Six others, which were entirely inſulated, and free from ſhoots, were much taller, and ſeemed to have been indebted for their height to the undivided effects of their ſap." Theſe cedars, formerly ſo numerous, are now almoſt entirely deſtroyed. In the year 1550 Bellon counted twenty-eight old ones; Pocock, in 1739, fifteen; and Schulz, in 1755, twenty, beſides ſome young ones. Volney, from report, makes the number to be only five or ſix. Trans.]

[*] Antiquit. lib. viii. 2, 7, of the Cologne edition 1691, fol. p. 258. Τεμων γαρ ξυλα πολλα και μεγαλα κεδρου τε και κυπαρισσου, δια των εμων επι θαλασσαν καταπεμψω, και κελευσω τους εμους σχεδιαν πηξαμενους, εις ὃν αν βουληθης τοπον. Exciſas multas et magnas trabes cedrinas atque cypariſſinas, per meos ad mare deducendas curabo; eoſdemque jubebo, ut compactis ratibus, ad quemcunque volueris tuæ regionis locum eas appellant, unde poſt per tuos Hieroſolyma deportentur.—Theſe letters have been printed by Fabricius in *Codex pſeudepigraphus Veteris Teſtamenti*. Hamburgi 1722, 8vo. i. p. 1026.

the clay or mud which the river Hipparis carried along with it, and depoſited in a lake of the ſame name. A paſſage in Pindar ſeems to confirm this account, which Ariſtarchus quotes in explaining it *; and, according to Bochart, ſome proof is afforded alſo by the name Camarina, as *chamar* or *chomar* ſignifies ſealing-clay †. In this tradition there is nothing improbable. In the like manner the Egyptians drew up mud from the lake Mœris ‡; and thus do the Dutch at preſent fiſh up in bag-nets the fine mud or ſlime which chokes up their rivers, ſuch as the Iſſel, and which they employ for various uſes. This explanation, however, has not been adopted by the old commentators of Pindar. Didymus ‖ and others aſſert that the poet alludes to wood for building the city being conveyed in floats on the river Hipparis. But whatever opinion may be formed of theſe elucidations of the ſcholiaſts, we have reaſon to conclude that the inhabitants of Camarina were much better acquainted with the floating of wood than with drawing up ſlime by means of bag-nets.

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* Κολλᾶ τε ϛαδι-
ων θαλαμων ταχεως
ὑψιγυιον αλσος,
απ' αμηχανιας αγων εις φαος
τονδε δᾶμον αϛων.

Hipparis aquas ſuppeditat populo, conglutinatque celeriter ſtabilium ædium altam ſilvam, e rerum inopia producens in lucem huncce populum civium: *Olymp.* v. 29. In the ſummer of the year 1760, when I heard Geſner explain Pindar, he tranſlated φαος or φως by the word *help*, which Hebraiſm occurs in the New Teſtament, and alſo in Homer. The ſtream therefore aſſiſted the inhabitants while under a great inconvenience.

† Chanaan, i. 29. p. 605.

‡ Herodot. lib. iii.

‖ Didymus ait, amnem per mediam ſilvam fluere; Camarinenſibuſque ligna cædentibus in ſtructuram dare ædificiorum; et

The Romans tranſported by water both timber for building and fire-wood. When, during their wars againſt the Germans, they became acquainted with the benefit of the common larch, they cauſed large quantities of it to be carried on the Po to Ravenna from the Alps, particularly the Rhætian, and to be conveyed alſo to Rome for their moſt important buildings. Vitruvius ſays * that this timber was ſo heavy, that, when alone, the water could not ſupport it, and that it was neceſſary to carry it on ſhips or on rafts. Could it have been brought to Rome, conveniently, ſays he, it might have

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et cum ipſi ex conſilii inopia neſciant qua ratione ea deducant ac deferant, excipere ea amnem, et copioſo ſuo flumine deferre in urbem. See the *Oxford edition of Pindar*, 1697, fol. p. 53 and 56, a, 37.

* Propter pondus ab aqua non ſuſtinetur, ſed, cum portatur, aut in navibus, aut ſupra abiegnas rates collocatur. - - - Hæc (materies larigna) per Padum Ravennam deportatur, in coloniam Faneſtri, Piſauri, Anconæ reliquiſque quæ ſunt in ea regione municipiis præbetur, cujus materiei ſi eſſet facultas apportationibus ad urbem, maxime haberentur in ædificiis utilitates. *Vitruv.* lib. ii. 9. p. 77.

have been uſed with great advantage in building. It appears, however, that this was ſometimes done; for we are told that Tiberius cauſed the Naumachiarian bridge, conſtructed by Auguſtus, and afterwards burnt, to be rebuilt of larch planks procured from Rhætia. Among theſe was a trunk one hundred and twenty feet in length, which excited the admiration of all Rome *.

That the Romans procured fire-wood from Africa, particularly for the uſe of the public baths, is proved by the privileges granted on that account to the maſters of ſhips or rafts by the emperor Valentinian †. Thoſe who have read the writings of the Latin authors with attention muſt have remarked other teſtimonies; but I have found no

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* Tiberius Cæſar, concremato ponte Naumachiario, larices ad reſtituendum cædi in Rhætia præfinivit. *Plin.* lib. xvi. cap. 39, p. 33. Ampliſſima arborum ad hoc ævi exiſtimatur Romæ viſa, quam propter miraculum Tiberius Cæſar in eodem ponte Naumachiario expoſuerat advectam cum reliqua materie; duravit ad Neronis principis amphitheatrum. P. 34.

† Codex Theodoſ. lib. xiii. tit. 5, 10, edition of Leipſic 1740, fol. vol. v. p. 76: Navicularios Africanos, qui idonea publicis diſpoſitionibus ac neceſſitatibus ligna convectant, privilegiis conceſſis dudum, rurſus augemus. *Lex* xiii. p. 78. Sed ſollicita inſpectione proſpiciatur, ne a quoquam amplius poſtuletur, quam neceſſitas exigit lavacrorum. Compare *Symmachi Epiſt.* lib. x. ep. 58. As far as I know, ſuch ordinances occur alſo in the Code of Juſtinian. The words, *Navigii appellatione etiam rates continentur*, in the *Digeſta*, lib. xliii. tit. 12, 14, cannot certainly be applied to ſuch floats, as ſome have imagined.

mention in the ancients of floating timber in ſingle planks, or of canals dug for that purpoſe; at leaſt as far as I can remember. In the Latin language alſo there are ſcarcely two words that allude to what concerns the floating of timber; whereas the German contains more of that kind, perhaps, than are to be found in any other; and I am thence induced to conjecture that our anceſtors were the firſt people who formed eſtabliſhments for this mode of conveyance on a large ſcale.

The earlieſt information reſpecting the floating of wood in Saxony appears to be as old as the year 1258*, when the margrave Henry the Illuſtrious remitted by charter to the monaſtery of Porta the duty collected at Camburg from the wood tranſported on the river Sale for the uſe of the monaſtery †. It is, however, uncertain whether wood really conveyed in floats, or tranſported in boats and lighters, be here meant. Much clearer information concerning wood floated on the Sale is contained in a letter, expedited in the year 1410 by the two brothers Frederic and William, landgraves of Thuringia, and margraves of Miſnia, in which, on account of the ſcarcity of wood that prevailed in their territories, they ſo much leſſened the toll uſually paid on the Sale as far as Weiſſenfels, that a Rheniſh florin only was demanded for floats brought on that river to Jena, and two Rheniſh ſtivers for thoſe carried to Weiſſenfels; but the proprietors of the floats were bound to be anſwerable for any injury occaſioned to the bridge *. In the year 1438, Hans Munzer, an opulent citizen of Freyberg, with the aſſiſtance of the then burgomaſters, put a float of wood upon the river Mulda, which runs paſt the city, in order that it might be conveyed thither for the uſe of the inhabitants and of the mines †; which ſeems to be a proof that the floating of timber was at that period undertaken by private perſons, on their own riſk and at their own expences. In 1486 the floating of wood on the Mulda by the people of Zwikaw, was oppoſed by the neighbouring nobility; but the rights of the city were protected by the Electors ‡. When the town of Aſcherſleben built its church in the year 1495, the timber uſed for the work was tranſported on the Elbe from Dreſden to Acken, and thence

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* See Sammlung vermiſchter nachrichten zur Sächſiſchen geſchichte, publiſhed at Chemnitz, between 1767 and 1777, in 12 vol. octavo. by G. J. Grundig and J. F. Klotzſch, vol. vi. p. 221.

† Pertuchii Chronic. Portenſe, p. 54. Hornii Henricus Illuſtris, p. 105. The words are: Telonium, quod de lignis ad uſum Portæ deducendis in Sala prope Camburgk dandum fuit, eccleſiæ Portenſi - - - - donavit.

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* Rudolphi Gotha Diplomatica, pars i. p. 279; and Horn, in Leben Churfürſt Friedrichs des Streitbaren, p. 754.

† Schmieds, Zwickauiſch Chronik, part i. p. 372, 427.

‡ Chronicon Aſcanienſe, in Abels Sammlung alter chroniken, p. 586.

on the Achſe to the place of its deſtination. This is the oldeſt account known of floating timber on the Elbe. In the year 1521, duke George cauſed a large canal to be cut at the village of Plauen, which was ſupplied with water from the Weiſeritz, and carried as far as Dreſden. It appears that in 1564 there was a float-maſter, who was obliged to give ſecurity to the amount of four hundred florins; ſo that the buſineſs of floating muſt, at that time, have been of conſiderable importance *. Floating of wood was undertaken at Annaberg in 1564, by George Oeder, one of the members of the council, and eſtabliſhed at the expence of 4000 florins †. Of the antiquity of floating in other German States I know nothing more than what is to be gathered from public ordinances reſpecting this object and foreſts; by which we learn that in the ſixteenth century it was practiſed in Brandenburg, on the Elbe, Spree and Havel; in Bavaria, and in the duchy of Brunſwick ‡.

As the city of Paris had conſumed all the wood in its neighbourhood, and as the price of that article became enormous on account of the diſtance of foreſts and the expence of tranſporting it, John Rouvel, a citizen and merchant, in the year 1549

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* Wecks, Dreſdener Chronik, p. 17.

† Jeniſii Annaberga, cap. 15.

‡ See the Foreſt laws in *Fritſchii Corp. juris ven. foreſt.*

fell upon the plan of conducting wood bound together along rivers which were not navigable for large veſſels. With this view, he made choice of the foreſts in the woody diſtrict of Morvant, which belonged to the government of Nivernois; and as ſeveral ſmall ſtreams and rivulets had their ſources there, he endeavoured to convey into them as much water as poſſible *. This great undertaking, at firſt laughed at, was completed by his ſucceſſor René Arnoul, in 1566. The wood was thrown into the water in ſingle trunks, and ſuffered to be driven in that manner by the current to Crevant, a ſmall town on the river Yonne; where each timber-merchant drew out his own, which he had previouſly marked, and, after it was dry, formed it into floats that were tranſported from the Yonne to the Seine, and thence to the capital. By this method large quantities of timber are conveyed thither at preſent from Nivernois and Burgundy, and ſome alſo from Franche-Comté. The French extol highly a beneficial eſtabliſhment formed by one Sauterau, in Morvant, at his own expence, by which the tranſportation of timber was rendered much ſpeedier, and for which a ſmall ſum was allowed him from the proprietors of all the wood floated on the Yonne.

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* Wood was conveyed in boats upon the Yonne ſo early as the year 1527, as has been related by Coquille in *Hiſtoire du Nivernois*, where he ſpeaks of Clamecy.

The ſucceſs of this attempt ſoon gave riſe to others. John Tournouer and Nicholas Gobelin, two timber-merchants, undertook to convey floats in the like manner on the Marne; and canals were afterwards conſtructed in ſeveral places for the purpoſe of forming a communication between different rivers. The French writers conſider the tranſportation of large floats, *trains de bois*, like thoſe formed at preſent, from the before-mentioned diſtricts, and alſo from Bourbonnois, Champagne, Lorraine, Montergis, and other parts of the kingdom, as a great invention; but I am firmly of opinion that this method was known and employed in Germany at a much earlier period *.

The floating of wood ſeems, like many other uſeful eſtabliſhments, to have been invented or firſt undertaken by private perſons at their own riſque and expence, with the conſent of governments, or at leaſt without any oppoſition from them; but as ſoon as it was brought to be uſeful and profitable, to have been conſidered among regalia. Hence, therefore, ſoon aroſe the float-regal, which, indeed, on account of the free uſe granted of rivers, the many regulations requiſite, and its connection with the foreſt-regal, can be ſufficiently juſtified. But when and where originated the term *jus grutiæ*, under which this regal is known by juriſts?

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* Traité de la police, par De la Mare, iii. p. 839. Savary, Dictionnaire de commerce, art. *Bois flotté*, i. p. 555, and art. *Train*, iv. p. 1077.

The few authors who have turned their thoughts to this queſtion have not been able, as far as I know, to anſwer it with certainty, nor even with probabilit. They have only repeated, without making any reſearches themſelves, what Stypmann[*] has ſaid on the ſubject; and the latter refers to a paſſage of Hadrian Junius, which I ſhall here more particularly notice. Junius, ſpeaking of the oldeſt families in the Netherlands, ſays that the family of Waſſenaer had formerly a certain ſupremacy over the rivers in Rhineland, ſo that no one, without their permiſſion, could keep ſwans on them; and that the brewers paid for the uſe of the water a certain tax called the *gruytgeld*, from which aroſe the *jus grutæ*. The origin of this word he did not know; but he conjectured that it was derived either from *gruta*, which ſignifies duck-weed (*lemna*), a plant that grows in the water and covers its ſurface during the ſummer, or from *grut*, an ingredient uſed in making beer[†]. It is certain

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[*] De jure maritimo, p. i. c. 10, n. 100.

[†] As what Junius ſays is quoted ſo incorrectly that no concluſion can be formed from it, I ſhall here inſert the paſſage at length, eſpecially as the book is ſcarce. In annalium monumentis memoratur Engiſtus Radbodo genitus, reverſus a Britannica expeditione victor, pyrgum Lugdum, alveo Rheni imminentem (quem Leydeburgum vulgus nuncupat) condidiſſe cum telonio,

that in the tenth, eleventh, and thirteenth centuries *gruta*, *grutt*, or *gruit* ſignified a tax which brewers were

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ſub Theodoſii imperatoris tempora, atque ex eo Burggraviorum nomen reliquum eſſe, imperiumque et jus principale in Rhenolandiam ab illis uſurpatum, in qua hactenus ut fiduciarii comitum clientes pro mercibus vectigal exigunt, et Plumarii comites *(pluymgraven)* nominantur, quod et illic et in tractu Delphenſi illorum injuſſu nemini fas ſit cygnos aut olores publice alere - - - Hinc manavit jus Grutæ, quod penes eoſdem ſemper extitit, quo coctores cereviſiarii pro uſu aquæ centeſimum illis perſolvunt; vernacula lingua *gruytgelt* vocat, ſive eam vocem a Flandris mutuata fuerit majorum noſtrorum ætas, qui lenticulam paluſtrem quæ in paludibus et ſtagnis per æſtatem aquæ ſupernatat, gratiſſimum anatibus pabulum, *grutum* appellant, quam nos corruptius *croes* vel *crooſt* dicimus; ut *Gruytgelt* ſit vectigal, quod penditur pro tollenda diſſipandaque lenticula aquas operiente, quo limpidam haſturis ſituliſque hauriant ad coquendum uſui hominum cerealem potum; ſive origo fluxerit (quod nonnulli volunt) ex uſu ſeminii cujuſdam aut herbæ, quam cereviſiæ incoquebant, olim *grutzung*, poſteris *ſcarpentange* dictæ, quæ cujuſmodi ſit, ignorare me fateor. Quod jus a dynaſtis potentioribus (ut ſolet avaritiam illorum et libidinem accendere atque alere æmulatio) uſurpatum poſtea video a Brederodiis apud Cainefatum caput Harlemum, et a Naelduicenis. *H. Junii Batavia.* Lugduni Bat. 1558, 4to. p. 327.—Compare *Hugo Grotius de antiquitate reipub. Batavicæ*, cap. 4, p. 357, publiſhed in *Guicciardini Belgicæ deſcript.* Amſtelod. 1660, 12mo. vol. iii. p. 57: Waſſenariis vectigalia, velut amnis Rheni cuſtodibus, ſolvebantur, quæ in hunc diem penes poſteros eorum manent.—*Les delices de la Hollande.* Amſterd. 1685, 12mo. p. 218: Les Waſſenaers tiennent leur origine d'une village qui eſt entre Leidem et la Haye, ou des droits qu'ils eurent les ſiecles paſſez ſur les eaux, les eſtangs et les lacs de la Hollande.—Thoſe who are fond of indulging in conjecture might form the following concluſion: The lakes were obliged to pay *; but the origin of the word has been ſufficiently explained neither by Junius nor any other writer. I no where find that it was uſed in ancient times for a float-duty; and this meaning Junius himſelf has not ſo much as once mentioned.

The word *gruit* occurs under a quite different ſenſe in a letter of inveſtiture of the year 1593, by which the elector of Cologne gave as a fief to the counteſs of Moers, the *gruit* within the town of Berg, with all its rents, revenues and appurtenances. "No other perſon was allowed to put *grudt* or any plant in beer, or to draw beer brought from other countries. On the other hand, the

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lakes and ſtreams belonged to the Waſſenaers, who kept ſwans, geeſe and ducks upon them. When the brewers were deſirous of clearing the water from the duck-weed, which in Fritſch's German Dictionary is called *enten-grutz*, in order that it might be fitter for uſe, they were obliged to pay a certain ſum to obtain permiſſion; and when the practice of floating timber began, the floats diſturbed the ducks, and deſtroyed the plant on which they fed, and the proprietors of floats were on this account obliged to pay a certain tax alſo. But was it cuſtomary at that period to float timber in the Netherlands?

* Gloſſarium manuale, iii. p. 850: *Gruta*, *Grutt*, *Gruit*, appellant tributum, quod pro cereviſia penſitatur. *Ch. Ottonis Imper.* ann. 999, *apud Wilh. Hedam*, p. 270, edit. prima: Teloneum et negotium generale fermentatæ cereviſiæ, quod vulgo *grutt* nuncupatur. In alia *Henrici Imp.* an. 1003, apud eundem Hedam, habetur *Gruit*. *Grut* in alia anni 1224. apud *Miræum*, t. i. p. 304. *Grutta* in *Hiſtoria comitum Loſſenſium*, p. 70.

counteſs was to make good *grutt*, and to cauſe it to be ſold at the price uſual in the neighbouring parts; ſhe was bound alſo to ſupply the elector gratis with what beer was neceſſary for family conſumption; and if more was required than uſual, on extraordinary occaſions, ſhe was to aſk and receive money. If any one in the town did not deliver good *gruidt*, and ſhould prove that he could not deliver better, as the fault was occaſioned by the *gruitte*, the loſs that might ariſe ſhould fall upon the counteſs *." The word *grut* or *gruilt* ſeems to occur here under a double meaning: as an ingredient in the beer, and as the beer itſelf which was made from it. Of this difficulty I have in vain endeavoured to find an explanation. *Grut*, perhaps, may ſignify malt. In Dutch and other kindred languages *grut* means the ſmall refuſe which is ſeparated from any thing; and to which *gruſch* bran, and *grütze* groats, have an affinity. May not ground malt be underſtood by it? I have thought likewiſe of a kind of herb-beer, which was much eſteemed in the ſixteenth century; and that *grut* might ſignify a mixture of herbs uſed for making that beer. It is probable that this word was confined within the boundaries of the Netherlands; and thence only, perhaps, is an explanation of it to be expected.

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* This curious charter may be found in the addenda, p. 70, to *Kunde's Darſtellung der anſpruche des grafen von Bentheim-Tecklenburg auf die Herrſchaft Bedbur*. Gottingen 1778, fol.

I am, however, ſtill unable to comprehend how the float-duty obtained the name of *jus grutiæ*; and in our kindred languages I can find no derivation of it. The German word *floſs*, from *flieſſen* to flow or glide; *fluſs*, a river, occurs in them all. The Dutch ſay *vlot*, *vlothcut*; the Swedes *en flott*, *flotta*, to float; *flot-wed*, float-wood; and the Engliſh *a float*, *to float*, &c.

LACE.

FIFTY years ago, when a knowledge of many uſeful and ingenious arts formed a part of the education given to young women deſtined for genteel life, one who ſhould have ſuppoſed that any reader could be ignorant of the manner in which lace is made, would only have been laughed at; but as moſt of our young ladies at preſent employ the greater part of their time in reading romances or the trifles of the day, it is probable that many who have even had an opportunity of frequenting the company of the fair ſex, may never have ſeen the method of working lace. For this reaſon, I hope I ſhall be permitted to ſay a few words in explanation of an art towards the hiſtory of which I mean to offer ſuch information as I have been able to collect.

Proper lace or point was not wove. It had neither warp nor woof, but was rather knit after the manner of nets (*filets*) or of ſtockings. In the latter, however, one thread only is employed, from which the whole piece or article of dreſs is formed; whereas lace is formed of as many threads as the pattern and breadth require, and in ſuch a manner that it exhibits figures of all kinds. To weave, or, as it is called, knit lace, the pattern, ſtuck upon a ſlip of parchment, is faſtened to the cuſhion of the knitting-box; the thread is wound upon the requiſite number of ſpindles, which are called bobbins; and theſe are thrown over and under each other various ways, ſo that the threads twine round pins ſtuck in the holes of the pattern, and by theſe means produce that multiplicity of eyes or openings which give to the lace the deſired figures. For this operation much art is not neceſſary; and the invention of it is not ſo ingenious as that of weaving ſtockings. Knitting, however, is very tedious; and when the thread is fine and the pattern complex, it requires more patience than the modern refinement of manners has left to young ladies for works of this kind. Such labour, therefore, is conſigned to the hands of indigent girls, who by their ſkill and dexterity raiſe the price of materials, originally of little value, higher when manufactured than has ever yet been poſſible by any art whatever. The price, however, becomes enormous when knit lace has been worked with the needle or embroidered: in French it is then called *points* [*].

The antiquity of this art I do not pretend to determine with much certainty; and I ſhall not be ſurpriſed if others by their obſervations trace it higher than I can. I remember no paſſage in the Greek or Latin authors that ſeems to allude to it; for thoſe who aſcribe works of this kind to the Romans found their opinion on the expreſſion *opus Phrygianum:* but the art of the Phrygians [†], as far as I have been able to learn, conſiſted only in needle-work; and thoſe ingenious borders which were ſewed upon clothes and tapeſtry, mention of which occurs in the ancients, cannot be called lace, as they have been by Braun [‡] and other writers.

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[*] A complete account of this art may be found in the Paris edition of the *Encyclopédie*, fol. iv. p. 844; in *Encyclopédie methodique des manufactures*, par Roland de la Platiere, i. p. 236; *Diction. de commerce*, ii. p. 52; and *Jacobſon's Schauplatz der zeugmanufacturen*, i. p. 125.

[†] This is proved by the *veſtes Phrygioniæ* of Pliny mentioned before in the article on wire-drawing. Thoſe who made ſuch work were called *phrygiones*. In the *Menæchmi* of Plautus, act ii. ſcene 3. a young woman deſirous of ſending her mantle to be embroidered, ſays: Pallam illam ad phrygionem ut deferas, ut reconcinnetur, atque ut opera addantur, quæ volo. Compare *Aulul.* act iii. ſcene 5; *Non. Marcellus*, i. 10, and *Iſidor.* 19, 22. The Greeks ſeem to have uſed the words κεντειν and καταστιζειν as we uſe the word *embroider*.

[‡] De veſtitu ſacerdot. Hebræorum, i. p. 212.

ters. I am however firmly of opinion that lace worked by the needle is much older than that made by knitting. Lace of the former kind may be found among old church furniture, and in ſuch abundance that it could have been the work only of nuns or ladies of fortune, who had little elſe to employ their time, and who imagined it would form an agreeable preſent to their Maker; for had it been manufactured as an article of commerce we muſt certainly have found more information reſpecting it.

We read in different authors that the art of making lace was brought from Italy, particularly from Genoa and Venice, to Germany and France; but this ſeems to allude only to the oldeſt kind, or that worked with the needle, and which was by far the deareſt. At any rate, I have no where found an expreſſion that can be applied to lace wove or knit. In the acccount given of the eſtabliſhment of the lace manufacture under Colbert in 1666, no mention is made but of *points* *.

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* Count de Marſan, youngeſt ſon of count d'Harcourt, brought from Bruſſels to Paris his former nurſe, named Du Mont, with her four daughters, and procured for her an excluſive right to eſtabliſh and carry on the lace manufactory in that capital. In a little time Du Mont and her daughters collected more than two hundred women, many of whom were of good families, who produced ſuch excellent work that it was in little

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I will venture to aſſert that the knitting of lace is a German invention, firſt known about the middle of the ſixteenth century; and I ſhall conſider as true, until it be fully contradicted, the account given us that this art was found out, before the year 1561, at St. Annaberg, by Barbara wife of Chriſtopher Uttmann. This woman died in 1575, in the ſixty-firſt year of her age, after ſhe had ſeen ſixty-four children and grand-children; and that ſhe was the inventreſs of this art is unanimouſly affirmed by all the annaliſts of that part of Saxony*. About that period the mines were leſs productive, and the making of veils, an employment followed by the families of the miners, had declined, as there was little demand for them. This new invention, therefore, was ſo much uſed

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or nothing inferior to that imported from other countries. See *La vie de Jean-Bapt. Colbert*, ſeconde edit. A Cologne, 1696, 12mo. p. 154.

* The oldeſt information on this ſubject is to be found in *Annabergæ urbis hiſtoria, auctore Paulo Jeniſio.* Dreſdæ 1605, 4to. ii. p. 33. Hoc anno, 1561, filum album retortum in varias formas Phrygio opere duci cœpit, quod ut ad mediocrem ornatum adhibitum reprehendi minime poteſt, præſertim re metallica vehementer attrita, ita cavendum tamen, ne vanitati et luxuriæ ſerviat. I found the reſt of my information in *C. Melzer, Berglauftige beſchreibung der ſtadt Schneeberg.* Schneeberg 1684, p. 471. *Hiſtoria Schneebergenſis.* Schneeberg 1716, 4to. p. 882. *Tob. Schmidt Chronici Cygnei pars poſterior*, or *Zwickauiſche Chronik.* Zwickau 1656, 4to. ii. p. 384. *Chriſt. Lehmanns Hiſtoriſcher ſchauplatz, des Obererzgebirges.* Leipzig 1699, 4to. p. 771.

that it was known in a little time among all the wives and daughters of the miners; and the lace which they manufactured, on account of the low price of labour, ſoon became faſhionable, in oppoſition to the Italian lace worked with the needle, and even ſupplanted it in commerce.

A doubt, however, has often occurred to me, which may probably occur alſo to ſome of my readers, that this Barbara Uttmann may be entitled only to the merit of having made known and introduced this employment; and that, as has often happened to thoſe who firſt brought a new art to their own country, ſhe may have been conſidered as the inventreſs, though ſhe only learned it in a foreign land, where it had been long practiſed. But I conjecture that this could not have been the caſe, as I find no mention of the art of knitting lace, nor any of the terms that belong to it, before the middle of the ſixteenth century.

ULTRA-

ULTRAMARINE.

ULTRAMARINE is a very fine blue powder, almoſt of the colour of the corn-flower or blue-bottle, which has this uncommon property, that, when expoſed to the air or a moderate heat, it neither fades nor becomes tarniſhed. On this account it is uſed in painting; but it was employed formerly for that purpoſe much more than at preſent, as ſmalt, a far cheaper article, was not then known. It is made of the blue parts of the lapis lazuli, by ſeparating them as much as poſſible from the other coloured particles with which they are mixed, and reducing them to a fine powder. The real lapis lazuli is found in the mountains of that part of Tartary called Bucharia, which extends eaſtwards from the Caſpian ſea *, and particularly at Kalab and Budukſchu. It is ſent thence to the Eaſt Indies, and from the Eaſt Indies to Europe. The Bucharians alſo carry fragments of it, weighing ſometimes a pound and more, to Orenburg, though leſs frequently than ſome years ago †. As large pieces

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* Brunichs Mineralogie. St. Peterſburg und Leipzig 1781, 8vo. p. 112.

† Falks Beytrage zur topographiſchen kenntniſs des Ruſſiſchen Reichs. Peterſburg 1786, 4to. vol. iii. Under the article of Minerals.

of a beautiful colour, and pure, are ſcarce even in that diſtant country, and as they are employed for making ornaments and toys, the rough ſtone itſelf is coſtly; and this high price is increaſed in the ultramarine by its laborious preparation, though in latter times the proceſs has been rendered much eaſier [*].

On account of the ſcarcity and great value of the lapis lazuli, other ſtones, ſomewhat like it only in colour, have been ſubſtituted in its ſtead; and hence have ariſen the many contradictions to be found in the works of different authors, particularly thoſe of the ancients, where they ſpeak of the properties and country of this ſpecies of ſtone. Many have conſidered the Armenian ſtone, which is a calcareous kind of ſtone tinged with copper; many the mountain blue or malachite, and many alſo blue ſparry fluor, and blue jaſper, as the lapis lazuli [†]; and ultramarine of courſe is not always

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[*] The old method of preparing ultramarine may be found in *De Boot, Gemmarum hiſtor.* Lugduni Bat. 1647, 8vo. p. 279. Various receipts from different books may be ſeen alſo in *Swedenborgii Lib. de cupro*, p. 465. Better directions are given in *Spielmanns Inſtitut. chem.* p. 45; *Sages Chemiſche unterſuchung verſchiedener mineralien*, Gottingen 1775, 8vo. p. 13; and *Rinmanns Geſchichte des eiſens*, Berlin 1785, 8vo. ii. p. 142. Formerly ultramarine was improperly called a precipitate or magiſterium.

[†] Beſides the before-mentioned proofs of the real lapis lazuli being found in Tartary, the ſame thing is confirmed by Taver-

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what it ought to be. At preſent, ſmalt of a good colour is often purchaſed therefore at a dear rate; and it is in greater requeſt, as it is certain that its colour is more durable in fire than even that of the lapis lazuli. Good ultramarine muſt be of a beautiful dark colour, and free from ſand as well as every other mixture. It muſt unite readily with oil; it muſt not become tarniſhed on a red-hot

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nier in *Beſchreibung der ſechs reiſen*, ii. p. 148. *Paulus Venetus*, alſo, in the edition of Helmſtadt, p. 70, ſeems to ſpeak of that country when he ſays: Suppeditat quoque mons alius in hac provincia (Balaſcia) lazulum, de quo fit azurum optimum, quale etiam in mundo non invenitur. Elicitur autem ex mineris non ſecus ac ferrum; præbent quoque mineræ argentum. A great many however aſſert that this ſpecies of ſtone is brought from Perſia: but it is not indigenous in that country, and is carried thither from Thibet. As the Perſians are remarkably fond of this paint, they endeavour to procure as much of it as poſſible; but Perſia itſelf produces only the blue copper ochre, which is ſometimes uſed there inſtead of ultramarine. Tavernier mentions this very particularly, and, as he dealt in precious ſtones, was not liable to be deceived. To rectify a prevailing miſtake, I ſhall here inſert his own words, taken from his Travels, vol. ii. p. 242. "In the copper-mines of Perſia, veins of lazur, which is much uſed in that country, and with which the flowers on the ceiling and roofs of apartments are painted, have alſo been found. Before theſe were diſcovered, the Perſians had no other lazur than the real kind which comes from Tartary, and is exceedingly dear. The Perſian lazur is a ſort of copper-ore; and when the ſtone is pounded and ſifted, which is the proceſs employed with the real kind, it forms a fine paint, which appears very bright and pleaſant. After this diſcovery, the Perſians durſt no more purchaſe hot tile or plate of iron, and it ought to diſſolve in ſtrong acids, almoe like the zeolite, without cauſing an efferveſcence. In the year 1763, an ounce of it at Paris coſt four pounds ſterling, and an ounce of *cendre d'outremer*, which is the refuſe, two pounds. At Hamburgh, Gleditſch ſold fine real Oriental ultramarine for a ducat per ounce, and

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chaſe the Tartarian lazur; and Mahomet-Beg iſſued an order that painters ſhould not uſe foreign but Perſian lazur. This prohibition however did not long continue; for the Perſian lazur could not ſtand the effects of the atmoſphere like the real kind, but in the courſe of time became of a dark and diſmal colour. Sometimes it was full of ſcales, and would not hang to the end of a ſoft hair bruſh. On this account it was ſoon neglected as a coloured earth, and the lazur of Tartary again introduced." This information is confirmed alſo by Chardin, in *Voyages en Perſe*, iv. p. 66. " In the country around Tauris," ſays the author, " is found lapis lazuli, but it is not ſo good as that of Tartary, as its colour changes, becomes dark, and afterwards fades." In page 255, he ſays likewiſe, " The lapis lazuli, called *lagſverd*, from which we have formed the word *azur*, is found in the neighbourhood, in the country of the Youſbecs, but the general magazine for it is Perſia." I do not believe that this ſpecies of ſtone was formerly procured from Cyprus, as is aſſerted in many books. Copper is a production of that iſland, and it produces even at preſent mountain blue. Thoſe alſo who aſſert that the colour of ultramarine fades in the fire, muſt not have been acquainted with the genuine ſort. See *Schriften der Schwediſchen Acad.* xii. p. 69. Montamy, in *Abhandlung von den farben zum porzellan*, Leipzig 1767, 8vo. p. 121, affirms that ultramarine is not good for enamel-painting, but it is certain that it was once uſed for that purpoſe.

warranted it to ſtand proof by fire; but whether it would ſtand proof by acids alſo, I do not know.

From what has been ſaid, a queſtion ariſes, whether ultramarine was known to the ancient Greeks and Romans? And this gives occaſion to another, Whether they were acquainted with lapis lazuli? The name lapis lazuli no one indeed can expect to find among them; for it is certain that we received it from the Arabians; and the word *ultramarinum* is barbarous Latin altogether. Some centuries ago, many foreign articles, brought from beyond ſea, had a name given them from that circumſtance; and the ancients applied the epithet *marinum* to various productions on the like account. Hence, in the decline of the Roman language was formed *ultramarinum*, which ſome have endeavoured to improve by changing it into *tranſmarinum*, but this among the ancients never ſignified a paint.

Though the ancient names of precious ſtones have neither been examined with ſufficient accuracy, nor diſtinguiſhed with the greateſt poſſible certainty, I think I can diſcover among them the lapis lazuli. I conſider it as the ſapphire of the ancients, and this opinion has been entertained by others; but I hope to render it more probable than it has hitherto appeared. In the firſt place, the ſapphire of the Greeks and Romans was of a ſky-blue colour, with a violet or purpliſh glance; and ſometimes it had a very dark or almoſt blackiſh blue colour. Secondly, this ſtone was not tranſparent. Thirdly, it had in it a great many gold points, or golden-yellow ſpots, but that which had feweſt was moſt eſteemed. Fourthly, it was poliſhed and cut; but when it was not perfectly pure, and had mixed with it harder extraneous particles, it was not fit for the hands of the lapidary. Fifthly, it appears that it was procured in ſuch large pieces that it could be employed for inlaid or moſaic-work. Sixthly, it was often confounded with, or compared to, copper-blue, copper-ore, and earth and ſtones impregnated with that metal. Seventhly, ſuch medicinal effects were aſcribed to it as could be poſſeſſed only by a copper calx; and laſtly, it forced its way through rocks of other kinds of ſtone, as we are informed by Dionyſius *.

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* Reddetur et per ſe cyanos, accommodata gratia paulo ante nominato colore cæruleo.—Ineſt ei aliquando et aureus pulvis, non qualis in ſapphiris. In ſapphiris enim aurum punctis collucet cæruleis. Sapphirorum, quæ cum purpura, optimæ apud Medos; nuſquam tamen perlucidæ. Preterea inutiles ſcalpturæ, intervenientibus cryſtallinis centris. Quæ ſunt ex iis cyanei coloris, mares exiſtimantur. *Plin.* lib. xxxvii. cap. 9. Corallo-achates guttis aureis ſapphiri modo ſparſa. *Ibid.* cap. 10. Sapphirus cæruleus eſt cum purpura, habens pulveres aureos ſparſos; apud Medos optimus, nuſquam tamen perlucidus. *Iſidori orig.* xvi. 9. Ἡ σαπφειρος. αυτη δ'εϛ. ὥσπερ χρυσοπαϛος. Theophraſt. de lapid. § 43. Sapphirus lapis ictis a ſcorpione potu prodeſſe

That a ſtone with theſe properties cannot be the ſapphire of our jewellers is beyond all doubt. Our real ſapphire does not form veins in other foſſils, but is found among ſand in ſmall cryſtals, ſhaped like diamonds; though they have ſometimes more the figure of columns, and perhaps the real ſapphires are nothing elſe than blue diamonds. Like

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exiſtimatur. Bibitur et contra inteſtinas exulcerationes. Extuberantia in oculis eorumque uvas et puſtulas reprimit; ſed et ruptas eorundem membranas cogit atque glutinat. *Dioſcorides*, v. 157. Paſſim item ſub rupibus ſubtus venæ pariunt aureæ cæruleæque pulcrum lapidem ſapphiri, χρυσειης κυανης τε καλην πλακα σαπφειροιο. *Dionyſ. Orb. deſc.* v. 1105. Sapphirus gemma purpuraſcit, ut ſpecies blattæ, id eſt, purpuræ nigræ. Multa ſunt ejus genera. Eſt enim regius, aureis punctis varius χρυσοστιγης. Non eſt vero hic in tanta admiratione, quanta ille, qui prorſus purpuraſcit. Et hic dicitur eſſe cum in India, tum in Æthiopia. Quocirca aiunt apud Indos templum extructum Baccho extare, quod gradus ex ſapphiro trecentos ſexaginta quinque habeat, quamvis multi fidem non adhibeant. Eſt vero gemma admirabilis, pulcerrima, gratiſſima; propterea etiam in armillis et monilibus reponi conſuevit, idque potiſſimum a regibus. Locum etiam inter remedia habet. Attrita enim et lacti permixta plagis quæ fiunt ex puſtulis albis et tuberculis medetur, ſi illis illinatur. *Epiphanius* de xii gemmis, § 5.

Sapphiri ſpecies digitis aptiſſima regum,
Egregium fulgens, puroque ſimillima cœlo,
Vilior eſt nullo virtutibus atque decore.
Hic et ſyrtites lapis a pleriſque vocatur,
Quod circa Syrtes Lybicis permixtus arenis,
Fluctibus expulſus fervente freto repertur.
Ille ſed optimus eſt quem tellus Medica gignit,
Qui tamen aſſeritur nunquam tranſmittere viſum.

Marbodeus de lapidibus, 53, p. 46.

other precious ſtones, they are always tranſparent; they have never gold points in them; their blue colour reſembles more or leſs that of blue velvet, and it is often very pale, and approaches ſeldom, or very little, to purple. Powder of ſapphire appears like fine pounded glaſs, exhibits no traces of copper, and can in no manner produce a blue paint, or be confounded with mountain-blue.

The queſtion, whether the ancients were acquainted with our ſapphire, and whether it may not belong to their amethyſts or hyacinths, I ſhall not here examine. I am inclined rather to decide in the negative than the affirmative; and at any rate the proof will always remain dubious. It might perhaps be difficult alſo to determine, whether every modern mineralogiſt who has ſpoken of the ſapphire was acquainted with, and alluded to, the real ſtone of that name.

On the other hand, we can affirm with the greateſt certainty, that the ſapphire of the ancients was our lapis lazuli. The latter is of a blue colour, which inclines ſometimes to violet or purple, and which is often very dark. It is altogether opake, yet it will ſtill admit of being compared to a ſky-colour; in mentioning of which Pliny had no idea of tranſparency, for he compares the colour of an opake jaſper to a ſky-blue [*]. The lapis lazuli is interſperſed with gold points, which were formerly conſidered as gold, but which are only particles of pyrites or marcaſite. It can be eaſily cut and formed into articles of various kinds, and at preſent it is often uſed for ſeals. Pliny, however, informs us, that it was not fit for this purpoſe when it was mixed with hard foreign particles, ſuch as quartz; and that which was of one colour was therefore much more eſteemed [†]. Many cut ſtones of this kind, which are conſidered as antiques, may be found in collections [‡]. I remember to have ſeen ſeveral works of this ſort in the excellent collection of the duke of Brunſwick, which, in all probability, are Egyptian, and which are worthy of an accurate deſcription. That lapis lazuli was uſed formerly for inlaid works I am well convinced, though at preſent I can produce no proofs. In how beautiful a manner it is employed for that purpoſe in Florentine works, is well known. The largeſt and moſt magnificent ſquares of lapis lazuli which I ever ſaw, are in the apartments at Zarſkoe-Selo, a ſummer palace near Peterſburg, belonging to the empreſs of Ruſſia, the walls of which are covered with amber, interſperſed with plates of this coſtly ſtone. I was informed that theſe plates were procured from Thibet. The doubt expreſſed by Epiphanius concerning ſtairs overlaid with lapis lazuli, reſpects only the great expence of it, and he perhaps imagined that the ſteps were entirely cut from the ſolid ſtone. The confounding the ſapphire with the *cyanus*, or comparing it to it, of which ſeveral inſtances occur, proves that the former muſt have had a great reſemblance to copper-ore; for that the *cyanus* is a kind of mineral or mountain blue, tinged with copper, I have proved already *. The blue colour of lapis lazuli has always been ſuppoſed to be owing to copper; but according to the lateſt diſcoveries it originates from iron[*]. The medicinal effects which the ancients aſcribed to their ſapphire could be produced only from a mixture of copper, as they conſidered the Armenian ſtone, or falſe lapis lazuli, to be the real kind. They recommended copper ochre for an inflammation of the eyes[†]. In the laſt place it agrees with what Dionyſius ſays, that the ſapphire or lapis lazuli was produced in the veins of other kinds of ſtone[‡]. The ſapphire alſo mentioned in the oldeſt writings of the Hebrews, appears to be no other than the ſapphire of the Greeks, or our lapis lazuli; for it was ſaid likewiſe to be interſperſed with gold points[‖].

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[*] Lib. ii. p. 782: Jaſpis aërizuſa—which I certainly do not, with Saumaiſe, conſider as the turquoiſe. We have blue jaſper ſtill.

[†] *Plin.* Inutiles ſcalpturæ, intervenientibus chryſtallinis centris.—Several learned men have underſtood this paſſage as if Pliny ſaid that the ſapphire could not be cut; but they ſeem not to have attended properly to the author's words, and to have forgot what the ancient artiſts called *centra* in ſtones and different kinds of wood which were to be cut. This Pliny himſelf explains, b. xvi. c. 39: Inveniuntur in quibuſdam, ſicut in marmore, centra, id eſt duritia clavo ſimilis, inimica ferris. In b. xxxviii. c. 2, he reckons alſo "prædurum ac fragile centrum" among the faults of natural cryſtal, which however, when it had not this blemiſh, was very proper for being cut. Theophraſtus uſes in the ſame ſenſe the word κεντρον.

[‡] See Chriſts Verzeichniſs zu Lipperts Dactyliotheca, p. 48, 62, 65, 97. ii. p. 11, 20, 29. iii. p. 13, 56.

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* Ariſtotelis Auſcultat. mirabil. cap. 59. p. 123.

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[*] The colour of iron ochre however is very liable to be changed by fire: but may it not be more durable when mixed in a certain manner? Wallerius is of opinion that the blue colour proceeds from ſilver. *Syſtema mineralium*, i. p. 313.

[†] Dioſcorides, Parabil. i. p. 10, 11, recommends ἰος and χαλκου ανθος.

[‡] Some years ago my former colleague, H. Laxman, diſcovered lapis lazuli in veins of granite near Baikal in Siberia. Theſe veins contained alſo along with it feldſpat *(ſpathum ſcintillans)* and a milky-coloured, perhaps zeolite, kind of ſtone like ſulphureous pyrites. See *Beobachtungen und entdeckungen der Berliner naturſ. geſelſch.* i. p. 402.

[‖] Braun de veſtitu ſacerdotum, ii. p. 530. See Michaelis *Supplementa ad lexica Hebraica*, num. 1775, from p. 1798 to 1800. The name ſapphire is very ancient.

The ancients therefore were acquainted with our lapis lazuli; but the queſtion whether they uſed it as a paint, or prepared ultramarine from it, I cannot anſwer with ſufficient certainty. It is poſſible that their *cæruleum* ſometimes may have been real ultramarine; but properly and in general it was only copper ochre *. The objection that the ancients made blue glaſs and blue enamel, and if they had not ſmalt they could uſe no other pigment that would ſtand fire but ultramarine, I ſhall anſwer in the next article.

Before I proceed to the oldeſt information with which I am acquainted reſpecting ultramarine, or the blue colour made from lapis lazuli, I ſhall communicate what I know of the origin and antiquity of the name commonly given to this ſtone. That I might be able to offer ſomething more on the ſubject than what has been ſaid by Saumaiſe †, I requeſted the opinion of profeſſor Tychſen, which, with his permiſſion, I have here ſubjoined ‡. It is, in the firſt place, certain that the word is of Perſian derivation, and the ſtone, as I have already remarked, has hitherto been brought to us from Perſia. Secondly, it ſignifies a blue colour. It was at firſt alſo the common name in Europe for blue ſtones and blue colours uſed in painting; and it was a long time uſed to expreſs mountain-blue impregnated with copper. The modern ſyſtematic mineralogiſts, it appears, firſt appropriated the corrupted Perſian word to the preſent lazur ſtone, properly ſo called; and thoſe therefore would commit an error in mineralogy who ſhould now apply this name to the Armenian ſtone, mountain-blue, or any other blue mineral combined with copper.

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* Plin. lib. xxxiii. cap. 13. Compare *Ariſtot. Auſcult. mirab.* p. 123.

† De homonymis hyles iatricæ, Trajecti ad Rhenum 1689, fol. p. 217.

‡ *Lazul* or *lazur* is not of Arabic but Perſian extraction. *Ladſchuardi* or *lazuardi* in Perſian ſignifies a blue colour and lapis lazuli. It ought properly to be pronounced *lazuverd*; but the

Without pretending to have diſcovered the firſt mention of the name lazuli in thoſe writings which have been handed down to us, I ſhall here offer, as the oldeſt with which I am acquainted, that found in

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the Arabs in their pronunciation contract the *v* very much, ſo that it ſounds like *u*; and one can ſay therefore *lazurd*. The derivative *lazurdi* or *lazuverdi* ſignifies *blue*.

The pronunciation *lazul*, with an *l* at the end, is agreeable to the common cuſtom among the Arabs of confounding *l* and *r*; as inſtead of *zingiber* they ſay *zengebil*. The initial *l* is not the article, but ſeems to belong to the word itſelf, becauſe it is not originally Arabic. It is worthy of remark, that the Spaniards call blue, *azul*, which is plainly derived from the above word; and the *l* has been omitted becauſe it was conſidered as the article, and thus the word was mutilated, as is often the caſe with foreign words among the Arabs, who ſay, for example, *Eſcandria*, inſtead of *al Eſcandria* (*Alexandria*).

in Leontius [*], who, where he gives directions for colouring a celeſtial globe, ſpeaks of *lazurium*. If Fabricius be right, Leontius lived in the ſixth century [†]. Among the receipts for painting, written in the eighth century, which Muratori [‡] has made known, we find an unintelligible account how to make *lazuri*, for which *cyanus compoſitus*, perhaps a prepared kind of mountain-blue, was to be employed. There is alſo another receipt which orders blue-bottles to be pounded in a mortar. It appears therefore that this word was uſed in the corrupted Latin of that period to ſignify a blue colour for painting. The ſame word, formed after the Greek manner, ſeems to have been uſed for blue by Achmet, the aſtrologer, who lived in the ninth century [||], and by Nonus in the tenth for a blue earth [§]. Of ſtill more importance is a paſſage of Arethas, who lived in the following century, and who, in his expoſition of a verſe in the book of Revelation [*], ſays, The ſapphire is that ſtone, of which *lazurium*, as we are told, is made [†]. This, therefore, is a ſtrong corroboration that the ſapphire of the ancients was our *lapis lazuli*, and appears to be the firſt certain mention of real ultramarine. The word however occurs often in the ſucceeding centuries for blue copper-ochre. Conſtantinus Africanus, a phyſician of the eleventh century, aſcribes to lapis lazuli the ſame medicinal qualities as thoſe of copper-ochre [‡]; as do alſo Avicenna, Averroes, and Myrepſius. The firſt, under the letter *lam*, gives a chapter entitled *lazuard*, to which the tranſlator has prefixed *De azulo, id eſt, de lapide Armenio*; and the laſt ſays expreſsly, that the *lapis lazuli* of the Latins is the *lazurios* of the

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[*] Coloretur atque incruſtetur ſphæra gypſo aut ceruſſa, ſi lignea eſt, ut ejus rimulæ et lacunculæ, ſi quæ fuerint, compleantur complanenturque, Poſt, ſiccato hoc colore, alioque ei craſſiore inducto, qualis eſt quem lazurium vocant. Και αλλῳ βαθει τινι χρωματι επαλειψαντες, οιον τῳ καλουμενῳ λαζουριῳ. Leontius de conſtructione Arateæ ſpheræ, p. 144. Leontius may be found in the Collection publiſhed by Joh. Commelin: *Aſtronomica veterum ſcripta*, 1589, 8vo.

[†] Biblioth. Græca, ii. p. 456.

[‡] Antiquitat, Ital. medii ævi, ii. p. 372, 378.

[||] Introductio in Aſtrolog. Ὑγρος εϛι, και χροιαν του λαζουριου εχει.

[§] Nonus de morb. curat. cap. 143: ἡ την Αρμενιαν βωλον πινειν ἡ τον λαζουριον.

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[*] Chap. xxi. ver. 19.

[†] Εξ οὑ Σαπφειρου φασι και το Λαζουριον χρωμα γινεσθαι. The expoſition of Arethas is printed with Œcumenii Commentaria in Novum Teſtamentum. Lutetiæ Pariſ. 1630, 1631, 2 vol. fol.

[‡] Lapis lazuli frigidus. Si in collyriis mittatur, oculis proficit. Palpebrarum pilos confortat, capillos confirmat et multiplicat - - - Lotus et propinatus, vomitum ſine omni anguſtia provocat. *De gradibus, quos vocant ſimplicium*, p. 362. Theſe words ſerve to explain and confirm farther what I have ſaid reſpecting *Ariſtotelis Auſcultat. mirab.* cap. 59, where we are told that copper-ochre promotes the growth of the hair and of the eye-brows. The works of Conſtantinus were printed at Baſle 1536-1539, in two folio volumes.

Greeks *. The words *azura*, *azurum*, *azurrum*, occur often alſo in that century for *blue*.

The name *ultramarine*, or, as it was firſt called, *azurrum ultramarinum*, I have not yet found in any writer of the fifteenth century. But it appears that it muſt have been common about the end of that century, as it was uſed by Camillus Leonardus in 1502 †. It is probable that it originated in Italy. In the firſt half of the ſixteenth century Vanuccio Biringoccio gave directions for preparing the real ultramarine, which he diſtinguiſhes with ſufficient accuracy from copper azur ‡, or, as he calls it, the *azurro dell' Alemagna.* At that period, however, the beſt method of preparing it muſt have been doubtful as well as little known, and on that account of no great benefit; for, in the beginning of the ſixteenth century, the father of the celebrated Giambatiſta Pigna, an apothecary at Modena, was in poſſeſſion of the ſecret for making the beſt ultramarine, by which he acquired more riches than would have ariſen from a large eſtate *. It is

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* *Λαπις λαζουλι, τουτεϛι λιθος λαζουριος.*—Matth. Silvaticus ſays: *Lapis lazuli* Latinis, Arabibus *Hager alzenar* ſivè *alzanar*; and alſo: *Lauzud*. Arab. Azurinum, lapis lazuli.

† Zumemellazuli ſive Zemech, Latine vero lapis lazuli. - - - Ex eo fit color vocatus azurrum ultramarinum. *Speculum lapidum*. Hamburgi 1717, 8vo. p. 125.

‡ Of azur there are two ſorts, one called by painters *azurro oltramarino*, and the other *azurro dell' Alemagna*. The ultramarine is that made of the ſtone known by the name of lapis lazuli, which is the proper matrix of gold-ore. This ſtone, after being pounded and waſhed, is reduced to an impalpable powder. It is then brought back to its lively and beautiful colour by means of a certain paſte compoſed with gum, and is refined and freed from all moiſture. This kind is that moſt eſteemed; and according to its colour and fineneſs is purchaſed at a high price by painters; for it not only adds great beauty to paintings, but it withſtands fire and water—two powers which other colours are not able to reſiſt. *Pirotechnia*, p. 38. The German azur of Biringoccio

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ringoccio is not ſmalt; for he deſcribes that colour before under the name of *zaffera.*

Fallopius, who in 1557 wrote his book *De metallis ſeu foſſilibus,* ſays, chap. xxxiii. p. 338: Cæruleus etiam vocatur lapis lazuli et lazurium ab Avicenna, et vulgo nominatur a pictoribus azurium ultramarinum, et dicitur azurium, vel *azurro,* a lapide lazuli; dicitur porro ultramarinum, quia defertur ex locis ultra mare, ut ex Cypro. Eſt pretioſi genus coloris, et caro admodum venditur, nam una uncia venditur centum ſcutatis aureis; venditur autem ita caro pretio, tum quia eſt venuſtiſſimus et pulcerrimus color, igni et fumo reſiſtens; ita ut pictura ex hoc colore non inficiatur a fumo, immo reddatur magis colorata et pulcra; tum propter præparationem difficillimam et longam, quæ requiritur in præparando tali colore.

* As young Pigna applied too cloſely to ſtudy, Bartholom. Ricci, in a letter ſtill extant, adviſed him to be more moderate, as he was not compelled by neceſſity to labour ſo hard. "Solus es, *ſays he,* in re bene ampla. Prædia enim tibi non deſunt, villæ atque ædes in urbe; ſupellex nobiliſſima; pater præterea eſt, qui tibi pro centum prædiis eſſe poteſt, qui vel uno cæruleo colore, quod noſtri ultramarinum appellant, conficiendo (ut in pharmacis componendis ejus ſcientiam atque uberrimum fructum omittam) ſolus eſt qui perfectam ſcientiam habeat, ingentes copias comparare poteſt, atque adeo quotidie non parvas comparat. *Riccii Opera,* vol. ii. p. 336; and *Tiraboſci Bibliotheca Modeneſe.* In Modena 1783, 4to. vol. iv. p. 134.

not, therefore, altogether true that Alexius Pedemontanus, as Spielmann relates [*], was the firſt perſon who mentioned ultramarine. I am of opinion that this Alexius, or Hieronymus Ruſcellai concealed under that name, who wrote in the beginning of the ſixteenth century, only firſt publiſhed a complete account of the method of preparing it. At any rate, his receipt has been always followed ſince that time as the beſt and the moſt certain [†]. But on what information is that aſſertion founded, which we read in Engliſh and French authors [*], that the preparation of ultramarine was found

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[*] Inſtitut. chemiæ, p. 45.

[†] The work of Alexius Pedemontanus *De Secretis* is no contemptible ſource from which materials may be drawn for the technological hiſtory of Inventions; and on this account it will perhaps afford pleaſure to many if I here give an account of the author, according to ſuch information as I have been able to obtain. Conrade Geſner ſeems not to have known any thing of him, as appears by his letters, written in 1564. See *Epiſtolæ medicinales*, p. 50; nor has he mentioned him in his *Bibliotheca*. It is ſaid in *Syllabus ſcriptorum Pedemontii, opere et ſtudio Andreæ Roſotti a Monteregali*, Monteregali 1667, 4to. p. 4. that it is not known when and where this pſeudonymous author lived. But Ciaconius, in *Bibliotheca libros et ſcriptores fere cunctos complectens*, Pariſiis 1731, fol. p. 94, ſays that his real name was Hieronymus Ruſcellai. The ſame account is given by Haller in *Biblioth. botan.* i. p. 325; and in *Biblioth. practica*, ii. p. 119: only he is called H. Roſſellus. Gobet, in *Les anciens minéralogiſtes de France*, Paris 1779, 8vo. ii. p. 705, tells us that this Jerome Ruſcelli died in 1565; and that his book was compoſed from his papers by Franc. Sanſovino, who publiſhed many works not his own, and printed, for the firſt time, at Milan in 1557. I have no where found a particular account of this Ruſcelli; and indeed it

it is always laborious to ſearch out any of that noble family, of which I have already ſpoken in the article on Lacmus. He appears to me to be none of thoſe mentioned in *Jochers Gelehrtenlexicon*. I have met with no earlier edition of his works than that of 1557 : but I ſuſpect that the firſt muſt be older. However much the book may have been ſought after, it ſeems to me improbable that three editions ſhould be publiſhed in Italian in the courſe of the firſt year, for, beſides that of Milan, two editions printed at Venice the ſame year, one in quarto and another in octavo, are ſtill extant. A French tranſlation alſo was publiſhed at Antwerp in 1557. Is it poſſible that an Engliſh tranſlation could be publiſhed at London in 1558, if the original appeared for the firſt time in 1557 ? At that period tranſlations could not be made ſo ſpeedily. *The Secrets of Alexis*, London 1558, is mentioned in *Ames's Typographical antiquities*, p. 296. I have in my poſſeſſion a French tranſlation by Chriſtofle Landré, Paris 1576, 12mo, which I ſeldom find quoted. It has a large appendix, collected from various authors.

It is well known that Joh. Jacob Wecker, a phyſician at Colmar, tranſlated into Latin this book of Alexius, and enlarged it with additions, under the title of *De ſecretis libri* xvii. The firſt edition, as Haller ſays, was printed at Baſle in 1559, 8vo. Every edition ſeems to differ from the preceding ; many things are omitted, and the new additions are for the moſt part of little importance. I have the edition of Baſle, 1592, 8vo. in which there is a great deal not to be found in that of 1662, and which wants ſome things contained in the edition of 1582. The lateſt editions are printed from that improved by Theod. Zwin-

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[*] See Savary, Dictionnaire de commerce, art. Outremer, which has been copied into Rolt's Dictionary of trade, London 1756. fol.

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found out in England, and that a ſervant of the Eaſt-India company diſcloſed it, in order to be revenged for ſome injury which he had ſuſtained?

COBALT, ZAFFER, SMALT.

THE name cobalt is given at preſent to ſuch minerals as contain that ſemi-metal, the calx of which can be melted into blue glaſs, and which communicates a blue colour to common glaſs. As the metal itſelf is fit for no particular purpoſe, the calx only is uſed. The cobalt is firſt roaſted and freed from the foreign mineral bodies, particularly biſmuth and arſenic, with which it is united: it

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ger, Baſle, 1701, 8vo. See *J. J. Scheuchzeri Nova litteraria Helvetica.* Tiguri 1703, 8vo. The laſt edition of this work by Zwinger was publiſhed at Baſle in 1753, which Haller has forgot to remark in his *Bibl. botan.* ii. p. 31. Though theſe books on the arts, as they are called, contain many falſehoods, they are ſtill worthy of ſome notice, as they may be reckoned among the firſt works printed on technology, and as they have as much induced learned men to pay attention to mechanics and the arts as they have artiſts to pay attention to books and written information. That reſearches of this kind, however, may appear tedious and not ſuited to the modiſh taſte, I am well aware; but thoſe who wiſh to illuſtrate the hiſtory of Inventions muſt not be diſguſted with ſuch labour; and I ſhall introduce them in future with a very ſparing hand.

is then well calcined, and ſold, either mixed or unmixed with fine ſand, under the name of zaffer *(zaffera)*; or it is melted with ſiliceous earth and potaſhes to a kind of blue glaſs called ſmalt, which, when ground very fine, is known in commerce by the name of powder-blue. All theſe articles, becauſe they are moſt durable pigments, and thoſe which beſt withſtand fire, and becauſe one can produce with them every ſhade of blue, are employed, above all, for tinging cryſtal and for enamelling; for counterfeiting opake and tranſparent precious ſtones, and for painting and varniſhing real porcelain and earthen and potters' ware. This colour is indiſpenſably neceſſary to the painter when he is deſirous of imitating the fine azure colour of many butterflies and other natural objects; and the cheaper kind is employed to give a blueiſh tinge to new-waſhed linen, which ſo readily changes to a diſagreeable yellow, though not without injury to the health, as well as to the linen.

The preparation of this new colour may be reckoned among the moſt beneficial inventions of modern times. It rendered of importance an uſeleſs and hurtful production; gave employment to a number of hands; aſſiſted in bringing many arts to a degree of perfection which they could never before attain; and has drawn back to Germany a great deal of money which was formerly ſent out of it for foreign articles.

Though there is no doubt that the proceſs uſed in the preparation of cobalt and ſmalt was invented about the end of the fifteenth or the beginning of the ſixteenth century, we have reaſon to aſk whether the ancients were acquainted with cobalt, and if they employed it for colouring glaſs. They opened and worked mines in various parts; and it is, at any rate, poſſible that they may have found cobalt; they made many ſucceſsful attempts to give different tints to glaſs *, and they produced blue glaſs and blue enamel. They may have learned by an accident to make this glaſs as they did to make braſs; and they may have continued to make the former as long as their ſupply of coloured earth laſted. When the mineral failed them, they may have loſt the art, in the ſame manner as the method of preparing Corinthian braſs † was loſt for a conſiderable ſpace of time. The uſe of cobalt does not imply a knowledge of its metal; for the moderns made braſs and ſmalt for whole centuries, before they learned to prepare zink and regulus of cobalt.

It ſeems, however, difficult to anſwer this queſtion; for one can ſcarcely hope to diſcover cobalt with any certainty among thoſe minerals mentioned by the ancients. They could deſcribe minerals

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* See what is ſaid in the firſt volume, under the article *Artificial Rubies.*

† See the annotations on *Ariſt. Auſcult. mirab.* p. 98.

in no other manner than according to their exterior appearance, the country where they were found, or the uſe to which they applied them. Now there is no ſpecies more various and more changeable in its figure and colour than cobalt, which on this account ſhews the impoſſibility of diſtinguiſhing minerals with ſufficient accuracy by external characteriſtics. Beſides, there are ſcarcely two paſſages of the ancients which ſeem to allude to it; and theſe, when cloſely examined, give us little or no information.

The meaning of the term *cadmia* is as various and uncertain as that of the word *cobalt* was two centuries ago. It ſignified often calamine; ſometimes furnace-droſs; and perhaps, in later times, alſo arſenic; but, as far as I know, it was never applied to cobalt till mineralogiſts wiſhed in modern times to find a Latin term for it *, and aſſumed that which did not belong properly to any other mineral. The well-known paſſage of Pliny †, in which Lehmann thinks he can with certainty diſtinguiſh cobalt, is ſo ſingular a medley that nothing to be depended on can be gathered from it. The author, it is true, where he treats of mineral pigments, ſeems to ſpeak of a blue ſand which produced different ſhades of blue paint, according as it was pounded coarſer or finer. The paleſt powder was called *lomentum*; and this Lehmann conſiders as our powder-blue. I am, however, fully convinced that the *cyanus* of Theophraſtus, the *cæruleum* of Pliny, and the *chryſocolla* *, were the blue copper earth, often already mentioned, which may have been mixed and blended together. Beſides,

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* I am of opinion that this Latin name for cobalt was firſt uſed by Agricola.

† Cœruleum arena eſt. Hujus genera tria fuere antiquitus: Ægyptium, quod maxime probatur. Scythicum, hoc diluitur facile; cumque teritur, in quatuor colores mutatur, candidiorem, nigrioremve. Præfertur huic etiamnum Cyprium. Acceſſit his Puteolanum et Hiſpanienſe, arena ibi confici cœpta. Tingitur autem omne, et in ſua coquitur herba, bibitque ſuccum. Reliqua confectura eadem, quæ chryſocollæ. Ex cœruleo fit quod vocatur

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vocatur lomentum; perficitur id lavando terendove; hoc eſt cæruleo candidius.—Uſus in creta, calcis impatiens. Nuper acceſſit et Veſtorianum, ab auctore appellatum. Fit ex Ægyptii leviſſima parte. - - - Idem et Puteolani uſus, præterque ad feneſtras; vocant cœlon. Non pridem apportari et Indicum eſt cœptum. Cœrulei ſinceri experimentum in carbone ut flagret. *Lib.* xxxiii. *cap.* 13. This, in part, is taken from *Theophraſt. de lapid.* § 97; but I ſhall quote only the tranſlation. Cœruleum (κυανος) unum eſt nativum, alterum artificioſum, ut in Ægypto. Genera enim cœrulei tria, Ægyptium, Scythicum et Cyprium. Optimum autem Ægyptium ad meraciores inductiones; Scythicum autem ad dilutiores. Factitium autem Ægyptium. Et qui ſcribunt de regibus, hoc etiam ſcribunt, quis regum primus artificiale cœruleum fecerit, nativum imitatus.—Aiunt qui pigmenta terunt, cyanum ex ſe facere quatuor colores; primum ex tenuiſſimis partibus candidiſſimum; ſecundum vero ex craſſiſſimis nigerrimum. Hæc autem arte fiunt; quemadmodum et ceruſſa.

* Ariſtot. Auſcult. mirab. p. 123.

Pliny clearly adds to it an artificial colour, which in my opinion was made in the ſame manner as our lack; for he ſpeaks of an earth boiled with plants, which acquired their blue colour, and which was in ſome meaſure inflammable. With theſe pigments walls were painted; but as many of them would not endure lime, they could be uſed only on thoſe which were plaſtered with clay (*creta*). The expreſſion *uſus ad feneſtras* has been miſapplied by Lehmann, as a ſtrong proof of his aſſertion; for he explains it as if Pliny had ſaid that a blue pigment was uſed for painting window-frames; but glaſs windows were at that time unknown. I ſuſpect Pliny meant to ſay only that one kind of paint could not be employed near openings which afforded a paſſage to the light, as it ſoon decayed and loſt its colour. This would have been the caſe in particular with lacks, in which there was a mixture of vegetable particles.

For my part, I find in this paſſage as few traces of ſmalt as Mr. Gmelin; and I agree with him in opinion that the ſtrong and unpleaſant mixtures ariſing from cobalt would, had it been known, have induced the ancients to make particular mention of it in their writings. Would not the arſenic, which is ſo often combined with cobalt, have given occaſion to many reports reſpecting the dangerous properties of theſe minerals? And would not arſenic and biſmuth have been ſooner known, had preparations of cobalt been made at ſo early a period? It is a circumſtance of great weight alſo, that in the places where the ancients had mines, and where antiquities painted or tinged blue, and reſembling in colour that produced by cobalt, have been dug up, cobalt has not been diſcovered, or has been diſcovered only in modern times. At preſent we know nothing of Egyptian, Arabian, Ethiopian, Italian and Cyprian cobalt; and in Spain * this mineral was firſt found in the reign of Philip IV. I ſhall here obſerve, that the iſland of Cyprus was formerly ſo abundant in copper that, in a mineralogical ſenſe, it might be called the iſland of Venus; and we can therefore entertain the leſs doubt that the *cæruleum Cyprium* was copper-blue.

The principal reaſon, however, why Lehmann, Paw †, Ferber, Delaval, and others, think that the ancients uſed ſmalt, and were acquainted with cobalt, is, that, as has been already ſaid, various antiquities both of painting and enamel have been diſcovered in which a blue appears that ſeems to give grounds for conjecturing that it was produced by cobalt. Ferber[*] ſpeaks of blue glaſs ſquares in moſaic work; and Delaval mentions old Egyptian glaſs-work of this colour[†]. It is well known alſo that the Chineſe and people of Japan gave to their porcelain that fine blue colour, for which it is celebrated, long before the diſcovery of ſmalt in Europe. On mummies a blue is ſeen likewiſe, which, even after ſo many centuries, ſeems to have loſt little or nothing of its beauty. We muſt therefore allow that the ancients uſed either ultramarine or cobalt.

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* Bowles, Introducion à la hiſtoria natural y à la geographia fiſica de Eſpaña. Madrit 1775, p. 399.

† Recherches philoſophiques ſur les Egyptiens et les Chinois. Berlin 1773, i. p. 345. An experimental inquiry into the cauſe of the changes of colours in opake and coloured bodies, by E. H. Delaval. London 1774, 4to. p. 56.

The firſt opinion ſeems, in regard of porcelain, to be confirmed by Duhalde[‡], who ſpeaks of a mine of *azur*, and relates that the Chineſe, in modern times, uſe inſtead of it, for painting their porcelain, a blue paint brought from foreign countries. It is probable that by the former he means lapis lazuli, and by the latter ſmalt, which is ſent, in large quantities, from Europe to China. The invention of ultramarine, however, appears to me too new, its effect on porcelain too uncertain, and its price too high to allow us to ſuppoſe that it has been much uſed. We ſhould therefore have been almoſt obliged to adopt the latter opinion, had not Mr. Gmelin proved by chemical experiments [*] that it is not only poſſible to give to glaſs and enamel a blue colour by means of iron; but that the before-mentioned antiquities, upon which ſo much ſtreſs has been laid, ſhew not the ſmalleſt traces of cobalt. He even made experiments upon blue tiles, found in a Roman teſſellated foot-pavement at Montbeillard; and likewiſe on the blue paint of the mummy which was preſented to our univerſity by the king of Denmark [†]. He has alſo mentioned various articles on which a blue colour is produced by the vitrification of iron. Of this nature are in particular thoſe ſlags found near the melting-houſes at the iron mines of the Harze foreſt; and I myſelf have ſeen ſlags which were of a blue colour exceedingly beautiful. Vulcanic ſlags, or ſcoriæ, found in the neighbourhood of Verona, Vicenza, and other parts of Italy, are mentioned alſo by Ferber [‡], which ſeems to confirm the conjecture of Dr. Bruckmann [||], that the ancients may have uſed ſuch ſlags for their works. It is probable that the ancients were firſt induced by the blue ſlag of their melting-houſes to make experiments on the colouring of glaſs with iron, and that in this art they acquired a dexterity not poſſeſſed at preſent; becauſe it was abandoned by our anceſtors after the invention of ſmalt, which is much more beautiful; and which can be uſed more eaſily and with more certainty. I cannot, however, deny that I have often lamented this loſs when I ſaw the excelleut blue in the painted windows at Gouda, Goſlar, and other places; though its beauty is much heightened by the tranſparency of the glaſs, and the ſtrong light that falls upon it from without.

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[*] Briefe aus Welſchland. Prag 1773, 8vo. p. 114, 136, 223.

[†] Blue enamelled figures of the Egyptian deities may be found in *Marb. antiq. dans la gallerie de Dreſde*, tab. 190.

[‡] Deſcription de l'Empire de la Chine et de la Tartarie Chinoiſe. A la Haye 1736, ii. p. 223, 230, 232. I have, however, often heard, and even remarked myſelf, that the blue on the new Chineſe porcelain is not ſo beautiful as that on the old.

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[*] De cæruleo vitro in antiquis monumentis, in *Commentationes Societatis Gottingenſis*, 1779, vol. ii. p. 41.

[†] See *Commentat. ſociet. Gottin.* 1781, vol. iv. p. 20.

[‡] Briefe, p. 30.

[||] Beytrage zu der abhandlung von edelſteinen. Brunſwick 1778, 8vo. p. 55.

I ſhall now proceed to the invention of the paint prepared from cobalt. About the end of the 15th century, cobalt appears to have been dug up in great quantity in the mines on the borders of Saxony and Bohemia, diſcovered not long before that period. As it was not known at firſt to what uſe it could be applied, it was thrown aſide as a uſeleſs mineral. The miners had an averſion to it, not only becauſe it gave them much fruitleſs labour, but becauſe it often proved prejudicial to their health by the arſenical particles with which it was combined; and it appears even that the mineralogical name *cobalt* then firſt took its riſe. At any rate, I have never met with it before the beginning of the ſixteenth century; and Matheſius and Agricola ſeem to have firſt uſed it in their writings.

Friſch derives it from the Bohemian word *kow*, which ſignifies metal; but the conjecture that it was formed from *cobalus*, which was the name of a ſpirit that, according to the ſuperſtitious notions of the times, haunted mines, deſtroyed the labours of the miners, and often gave them a great deal of unneceſſary trouble, is more probable; and there is reaſon to think that the latter is borrowed from the Greek. The miners, perhaps, gave this name to the mineral out of joke, becauſe it thwarted them as much as the ſuppoſed ſpirit, by exciting falſe hopes and rendering their labour often fruitleſs *. It was once cuſtomary, therefore, to introduce into the church ſervice a prayer that God would preſerve miners and their works from *kobolts* and ſpirits.

Reſpecting the invention of making an uſeful kind of blue glaſs from cobalt we have no better information than that which Klotzſch * has publiſhed from the papers of Chriſtian Lehmann. The former, author of an hiſtorical work reſpecting the upper diſtrict of the mines in Miſnia, and a clergyman at Scheibenberg, collected with great diligence every information that reſpected the hiſtory of the neighbouring country, and died, at a great age, in 1688. According to his account, the colour-mills, at the time when he wrote, were about a hundred years old; and as he began firſt to write towards the end of the thirty years' war, the invention ſeems to fall about 1540 or 1560. He relates the circumſtance as follows: "Chriſtopher Schurer, a glaſs-maker at Platten, a place which belongs ſtill to Bohemia, retired to Neudeck, where he eſtabliſhed his buſineſs. Being once at Schneeberg, he collected ſome of the beautiful coloured pieces of cobalt which were found there, tried them in his furnace; and finding that they melted, he mixed ſome cobalt with glaſs metal, and obtained fine blue glaſs. At firſt he prepared it only for the uſe of the potters; but in the courſe of time it was carried as an article of merchandize to Nuremberg, and thence to Holland. As painting on glaſs was then much cultivated in Hollan , the artiſts there knew better how to appreciate this invention.

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* Matheſius, in his tenth Sermon, p. 501, where he ſpeaks of the *cadmia foſſilis*, ſays: "Ye miners call it *kobolt*; the Germans "call the black devil and the old devil's whores and hags old "and black *kobel*, which by their witchcraft do injury to people "and to their cattle." - - - Whether the devil, therefore, and his hags gave this name to cobalt, or cobalt gave its name to witches, it is a poiſonous and noxious metal. *Agricola, De animantibus ſubterraneis*, ſays, at the end: Dæmones, quos Germanorum alii, aut etiam Græci, vocant cobalos, quod hominum ſunt imitatores. Bochart, in his *Canaan*, i. 18, p. 484, gives a Hebrew derivation of κοϐαλος. It appears to be the ſame as *covalus* and *gobelinus*, the latter of which was uſed by Ordericus Vitalis in the eleventh century as the name of a ſpirit or phantom. See *Menage, Diction. etymol.* i. 681.

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* Sammlung zur Sächſiſchen geſchichte, iv. p. 363.

vention *. Some Dutchmen therefore repaired to Neudeck, in order that they might learn the proceſs uſed in preparing this new paint. By great promiſes they perſuaded the inventor to remove to Magdeburg, where he alſo made glaſs from the cobalt of Schneeberg; but he again returned to his former reſidence, where he conſtructed a hand-mill to grind his glaſs, and afterwards erected one driven by water. At that period the colour was worth ſeven dollars and a half per cwt. and in Holland from fifty to ſixty florins. Eight colour-mills of the ſame kind, for which roaſted cobalt was procured in caſks from Schneeberg, were ſoon conſtructed in Holland; and it appears that the Dutch muſt have been much better acquainted with the art of preparing, and particularly with that of grinding it, than the Saxons; for the elector John George ſent for two colour-makers from Holland, and gave a thouſand florins towards the enabling them to improve the art. He was induced to make this advance chiefly by a remark of the people of Schneeberg, that the part of the cobalt which dropped down while it was roaſting contained more colour than the roaſted cobalt itſelf. In a little time more colour-mills were erected around Schneeberg.

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* Guicciardini in his *Deſcriptio Belgii*, i. p. 4, ſays: Vitro quo pacto colores imprimantur et incoquantur, Belgarum inventum eſt. Albinus in *Meiſniſcher bergchronik*, p. 159, ſpeaks of the paint for enamel made at Antwerp.

Hans Burghard, a merchant and chamberlain of Schneeberg, built one by which the eleven mills at Platten were much injured. Paul Nordhoff, a Frieſlander, a man of great ingenuity, who lived at the Zwittermill, made a great many experiments in order to improve the colour, by which he was reduced to ſo much poverty that he was at length forced to abandon that place, where he had been employed for ten years in the colour-manufactory. He retired to Annaberg, eſtabliſhed there in 1649, by the aſſiſtance of a merchant at Leipſic, a colour-manufactory, of which he was appointed the director; and by theſe means rendered the Annaberg cobalt of utility. The conſumption of this article however muſt have decreaſed in the courſe of time; for in the year 1659, when there were mills of the ſame kind at more of the towns in the neighbourhood of mines, he had on hand above 8000 quintals." Thus far Lehmann.

This information is in ſome meaſure confirmed by Melzer *, who ſays, that the mines of Schnee-

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* Chriſtian Melzers Berglauftige beſchreibung der ſtadt Schneeberg. Schneeberg 1684, 4to. p. 405. The ſame account is given in his *Hiſtoria Schneebergenſis*, that is, *Erneuerte ſtadt- und berg-chronika der ſtadt Schneeberg*. Schneeberg 1716, 4to. In theſe works one may ſee the diſpoſitions made from time to time by the electors of Saxony, to ſupport this highly profitable employment and trade. The lateſt information on this ſubject is to be found in *Von Hoffmanns Abhandlung über die eiſenhütten*, Hof. 1785, 4to.

berg, which were firſt diſcovered in the middle of the fifteenth century, had declined ſo much towards the middle of the ſixteenth, that it was impoſſible to get any profit by them till the year 1550, when a greater advantage aroſe from the new method of uſing cobalt. About this period a contract was entered into with the Dutch, who agreed to take the roaſted cobalt at a certain price. Lehmann * ſays, but without adducing any proofs, that a manufactory for making blue glaſs was erected by Sebaſtian Preuſsler, between Platten and Eybenſtock, ſo early as 1571. Koſsler †, who died in 1673, in the ſeventy-ſixth year of his age, gives us to underſtand that a century and a half before his time, cobalt was procured and ſold as zaffer; but that the colour-mills in the country had been eſtabliſhed only about ſixty years. I conjecture therefore, that in the beginning of the ſixteenth century, the roaſted cobalt, to which ſand was added, in order that the nature of it might be more concealed, and the farther preparation of it rendered more difficult, was given up to the Dutch, even in the beginning of the ſixteenth century ‡, and that theſe people by melting it

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* Cadmiologia, i. p. 14.

† Speculum metallurgiæ politiſſimum. Dreſden 1700, fol. p. 165.

‡ I ſay, in the beginning of the ſixteenth century, on the authority

it anew, or at leaſt by pounding it finer, derived the greateſt benefit from it long before the Saxons themſelves conſtructed mills according to the model of thoſe uſed in Holland. At preſent many Dutchmen grind German cobalt with very great advantage *.

It appears that this new paint was not made known in books till a late period. Agricola was not acquainted with the blue glaſs, nor is zaffera mentioned either by him or Matheſius. Albin alſo, who indeed derived the greater part of his in-

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rity of the following information in *Melzers Berglauſtige beſchreibung Schneebergs*, p. 469, which ſeems not to have been noticed by others. " Peter Weidenhammer, a Franconian, came hither poor; but by means of a colour he procured from pounded biſmuth, and of which he exported many quintals to Venice, at the rate of twenty-five dollars per quintal, he ſoon acquired great riches, and built a beautiful houſe in the market-place. His name is inſcribed in the lower window of the chancel of the great church, with the date 1520." At that period a great deal of this paint was prepared at Venice, and it may therefore be eaſily comprehended how Vannuccio could be ſo early acquainted with zaffera.

[*] How early manufactories for blue paint were erected beyond the boundaries of Saxony and Bohemia I do not know, as I have remarked no information on that ſubject. We are however told by Calvor, in *Beſchreibung des maſchinenweſens am Oberharze*, ii. p. 202, that a perſon was engaged to ſuperintend the blue-paint-manufactory at St. Andreasberg in the year 1698.

formation from theſe two writers, ſays not a word reſpecting it; but he tells us that biſmuth when put in veſſels grew together again [*]. He ſeems therefore to allude to cobalt roaſted and mixed with ſand, which when packed up becomes a ſolid body, whereas biſmuth which has been purified by roaſting can never aſſume that ſtate. Vanuccio Biringoccio [†], the oldeſt writer in whoſe works I have as yet obſerved the name *zaffera*, deſcribes its uſe for painting glaſs, and calls it a heavy mineral, without defining it any farther. Cardan [‡] gives the name of zaffera to an earth which colours glaſs blue. Cæſalpin ſays it is a ſtone [||]; and Julius Scaliger muſt have known as little of it, elſe he would have mentioned it in his Exercitations on Cardan. Porta, who employed great diligence to acquire knowledge of this kind, often mentions *zaphara figulinorum*, without telling us what it is; but he deſcribes how it muſt be melted, poured into water, pounded, ſifted, and reduced into a fine powder in order to be employed for making artificial precious ſtones [*]. Neri, who wrote about the year 1609 [†], knew nothing more of it; and Merret, who lived in the middle of the ſixteenth century, confeſſes that he knew not what *zaffera* was, but he believed that it was a new German invention, at leaſt that it was brought from Germany, and that it ſeemed to him to be made from copper and ſand, with the addition perhaps of calamine [‡]. The firſt perſon who properly explained *zaffera* in his writings,and gave a correct account of the method of preparing it, is, in my opinion, Kunkel [||] in his annotations on Neri and Merret. That writer ſays, zaffera was by the miners called *zaſloer*, and that ſand was mixed with it only that the powder-blue uſed by women for linen, and by painters called blue ſmalt, might not be imitated in other countries.

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[*] Meiſniſche bergchronik, p. 133. tit. 16.

[†] La zaffera é un' altro mezzo minerale ponderoſo, come metallo, che per ſe ſolo non fonde, et in compagnia di coſe vetrificate fa come aqua, et tegne in azurro tal che chi vuol tegner vetri, o dipinger vaſi di terra vitriati di color azurro adopera queſta, et a voglia dell' artifice ſerve nelle ſopradette operationi, ancor per negro, caricandole di piu quantità di queſta, che per azurro non comporta.

[‡] Lib. v. De ſubtil.

[||] Lib. ii. cap. 55.

Koſler ſays, the Bohemian cobalt is not ſo good as that of Miſnia, and that its colour is more like that of aſhes. That Brandt, a member of the

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[*] Magiæ naturalis lib. vi. 4to. Francofurti 1595, 8vo. p. 271.

[†] De arte vitriaria, cum Chriſt. Meretti obſervat. Amſtelod. 1668, 12mo. lib. i. cap. 12. p. 32.

[‡] De Arte vitriar. p. 327.

[||] Glasmacherkunſt. Nurnberg 1743, 4to. p. 46.

Council of Mines in Sweden, firſt aſſerted, that cobalt contained a peculiar kind of ſemimetal, muſt be ſo well known to mineralogiſts, that it ſcarcely deſerves to be mentioned *.

TURKEYS.

THAT theſe fowls, which at preſent are every where common, were brought to us from a different part of the world, is, I believe, generally admitted; but reſpecting their original country, and the time when they were firſt introduced into Europe, there is much difference of opinion among thoſe who in latter times have made reſearches on that ſubject †. I ſhall therefore compare what has been

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* Act. litter. et ſcient. Upſal 1733. Wallerii Syſtema miner. ii. p. 164.

† The principal works in which information may be found on this ſubject, are Perrault in *Mémoires pour ſervir à l'hiſtoire naturelle des animaux*, which forms the third part of *Mémoires de l'Academie Royale des Sciences depuis 1666 juſqu'à 1699. Traité de la police, par De la Mare*, ii. p. 726. *Buffon, Naturgeſchichte der vögel*, edition of Berlin, iv. p. 213 and 239. *Pallas, Spicilegia Zoologica*, faſcic. iv. p. 10. Pennant, in the Philoſophical Tranſactions, vol.

been advanced on both ſides with what I have remarked myſelf, and ſubmit my deciſion to the judgment of the reader.

The queſtion, whether turkeys or Turkey-fowls were known to the Greeks and the Romans, will depend upon defining what thoſe fowls were to which they gave the name of *meleagrides* and *gallinæ Africanæ*; for in the whole ornithology of the ancients, there are no other kind that can occaſion doubt. It has however been juſtly remarked by Perrault and others, that every thing which we find related by the ancients of the *meleagrides* can be applied only to the pintado or Guinea fowl (*Numida meleagris Linn.*), and not to the turkey; and that the *gallinæ Africanæ* were only a variety of the former, or a ſpecies that approached nearly to them. Their ſpots diſpoſed in ſuch a manner as if formed by drops, on account of which, in modern times, they have been called *pintados* and *peintades*, and the marks on the feathers of the wings accord perfectly with the deſcription given of them by Clytus, the ſcholar of Ariſtotle [*]; though

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vol. lxxi. part i. p. 72. Pennant's Arctic Zoology, vol. ii. Birds, p. 294. Miſcellanies by Daines Barrington. London 1781, 4to. p. 127.

[*] Athenæus, Deip. lib. xiv. p. 655. Moſt of thoſe paſſages of the ancients in which this fowl is mentioned have been collected by

though in northern countries, ſome Guinea fowls are found, the colour of which is more mixed with white. But this is a variation not uncommon among birds in general when removed from their native country, as is proved by the white peacocks, which were firſt obſerved in Norway. The coloured hood of thick ſkin which covers the head, has alſo been accurately deſcribed by Clytus, as well as the coloured fleſhy excreſcence on the bill *(palearea carunculacea)*. In ſize the *meleagrides* were like our largeſt common fowls, which is true alſo of the pintado; and we muſt acknowledge with Clytus, that its naked head is too ſmall in proportion to the body. The figure of the pintado, like that of the partridge, and its drooping tail, correſpond equally well with the epithet *gibberæ*, eſpecially as the poſition of its feathers occaſions its back to appear elevated or bent upwards. The feet are like thoſe of the domeſtic fowl, but they are deſtitute of the ſpurs with which thoſe of the latter are furniſhed; and the pintado lays ſpotted eggs, as deſcribed by Ariſtotle; but theſe, by the manner in which the fowls are reared in Europe, are liable to variations. It deſerves to be remarked above all,

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by Conrade Geſner, in his *Hiſtor. avium*, p. 461, and by Aldrovandus in his *Ornithologia*, lib. xiii. p. 18. When we conſider the feathers as delineated by Perrault, we ſhall find the compariſon of Clytus more intelligible than it has appeared to many commentators.

that both ſexes of the *meleagrides* are ſo like, that they can ſcarcely be diſtinguiſhed; and this circumſtance alone is ſufficient to confute thoſe who pretend that the *meleagrides* were our turkeys. Had that been the caſe, it is impoſſible that Clytus in his deſcription, which ſeems to have been drawn up with great care, ſhould have omitted the proud and ridiculous geſtures of the turkey-cock when he ſtruts about with his tail ſpread out like a fan, or thrown into a circular form, and his wings trailing on the ground, or the long excreſcence that hangs down from his bill, and the tuft of black hair on his breaſt. The unpleaſant cry, and the unſocial diſpoſition of the meleagrides, are obſerved in the Guinea fowls, which, as the ancients juſtly remarked, frequent rivers and marſhes, where turkeys on the other hand never thrive.

The ancients aſſure us, that the native country of the *meleagrides* was Africa*, where the Guinea fowls are ſtill found in a wild ſtate, but where our turkeys were never ſeen wild. When writers however mention places not in Africa, to which the former were brought, we are not to ſuppoſe that they were carried thither directly from Africa. The difference which Columella and Pliny * make between the *meleagrides* and *gallinæ Africanæ* is ſo trifling, as to imply only a variety of the ſpecies; and the opinion of profeſſor Pallas, who has occaſionally collected a number of important obſervations which may ſerve to explain the natural hiſtory of the ancients, is highly probable, that we are to underſtand under it the *Numida mitrata*, which he has deſcribed. The red creſt which the laſt-mentioned bird always has, and which almoſt alone diſtinguiſhes it from the common Guinea fowl, ſeems fully to prove this opinion †. I ſhall here take occaſion to remark, that Buffon erroneouſly affirms, that the Guinea fowls, which were tranſmitted from the Greeks and the Romans, became extinct in Europe in the middle ages; for we find mention made of them in Engliſh writers, under the name of *Aves Africanæ*, *Afræ*, ſo early as about the year 1277 *.

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* Plin. Strabo. The following paſſage of the *Periplus Scylacis*, p. 122, which I have never found uſed in the hiſtory of the *meleagrides*, is worthy of remark. This geographer, ſpeaking of a lake in the Carthaginian marſhes, ſays: Circa lacum naſcitur arundo, cyperus, ſtoebe et juncus. Ibi meleagrides aves ſunt; alibi vero nuſquam niſi inde exportatæ. The above paſſage, in my opinion, may ſerve to ſupply a deficiency in Antigonus Caryſtius's *Hiſt. mirabil.* cap. 11.

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* Gallina Africana, quam plerique Numidicam dicunt, meleagridi ſimilis, niſi quod rutilam galeam et criſtam capite gerit, quæ utraque ſunt in meleagride cœrulea. *Columella*, viii. 2, 2, p. 634.

† I have here quoted nothing more than what I thought requiſite to prove that the *meleagrides* of the ancients were our Guinea fowls, becauſe I had no intention of treating fully on a ſubject which has been handled by ſo many others; and becauſe I had only to ſhew that they were not turkeys. Had not this been the caſe, it would have been neceſſary for me to collect into one point of view every thing that the ancients have ſaid of theſe fowls, with the words uſed by the different writers. It may however be ſaid, that by this mode of examining a diſputed point, a mode indeed practiſed by many, the reader may be led to an ill-founded approbation, becauſe what is not agreeable to the

That the ancients were not acquainted with our turkeys is confirmed ſtill more by the teſtimony of various hiſtorians and travellers, who aſſure us in the firſt place, that theſe birds are ſtill wild in America; ſecondly, that they were brought to us from America; and thirdly, that before the diſcovery of the New World they were not known in Europe. Beſides, we are enabled from the information which they give us, to ſee how and when theſe

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the author's aſſertion may be eaſily concealed. But this obſervation is not applicable to me; for I confeſs, that I do not know with certainty whether the Guinea fowls are as careleſs of their young as the *meleagrides* are ſaid to have been; whether their cry, which I have often enough heard, and which is indeed diſagreeable, agrees with the κακκαζειν of *Pollux*, v. § 90; and whether the αλεκτρυονες μεγεθει μεγιστοι, mentioned in Ælian's *Hiſt. animal.* xvi. 2. belong to the Guinea fowls, or, as Pennant will have it, to the *Pavones bicalcarati*.

* Kennet's Parochial antiquities, p. 287. The meleagrides alſo, which Volateran ſaw at Rome in 1510, were of the ſame kind. The whole paſſage however does not deſerve that attention which De la Mare has paid to it: *Commentarii urbani* lib. xxv. p. 949.

theſe animals were conveyed to thoſe countries where they are at preſent reared as domeſtic fowls; and theſe proofs appear to me ſo ſtrong, that I conclude Barrington aſſerted the contrary, that he might obtain aſſent not ſo much by the force of truth as by advancing abſurdities. All animals multiply more eaſily, and become larger, ſtronger, and more fruitful in thoſe places which nature has aſſigned to them for a reſidence; that is, where they originally lived wild; and this obſervation ſeems to hold good in regard to the turkeys in America. It is indeed probable, that the number of wild animals will always decreaſe in proportion as countries are peopled, and as woods are cut down, and deſerts cultivated; it is probable alſo, that at laſt no wild animals will be left, as has been the caſe with ſheep, oxen, and horſes, which have all long ago been brought into a ſtate of ſlavery by man [*]. The teſtimony therefore of thoſe who firſt viſited America, and who found there wild turkeys, deſerves the greater attention.

The firſt author in whom I find mention of them is Oviedo, who wrote about the year 1525[†]. He has deſcribed them minutely with that curioſity and attention which new objects generally excite; and as he was acquainted with no name for theſe animals, till then unknown to the Europeans, he gave them that which he thought beſt ſuited to their figure and ſhape. He calls them a kind of peacocks, and he relates that even then, on account of their utility, and the excellent taſte of their fleſh, they were not only reared and domeſticated by the Europeans in New Spain, where they were firſt found,

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[*] This obſervation is made by Varro in *De re ruſtica*, ii. 1. p. 238.

[†] I ſhall here give the paſſage in Italian from the third volume of the Collection of Voyages by Ramuſio. *Sommario dell' Ind. Occid.*

Occid. del Sig. Gonzalo di Oviedo, cap. 37: Altri pavoni, maggiori, e migliori da mangiare, e più belli, ſi ſon trovati nella provincia detta la Nuova Spagna, de' quali molti ſono ſtati portati nell' iſole, e nella provincia di Caſtiglia dell'Oro, e ſi allevano domeſtici in caſa de' Chriſtiani. Di queſti le femine ſono butte, e i maſchi belli, e molto ſpeſſo fanno la ruota, benchè non abbiano coſi gran coda, nè tanto bella, come quei di Spagna, ma in tutto il reſto della piuma ſono belliſſimi. Hanno il collo e la teſta coperta di una carnoſità ſenza piuma, la quale mutano di diverſi colori quando gli vien ſa fantaſia, e ſpecialmente quando fanno la ruota, la fanno diventare molto roſſa, e come la laſciano giu, la tornano gialla, e di altri colori, e poi come nero verſo il berrettino, e alcune volte bianca. Ha nella fronte ſopra il becco a modo di un picciolo corno di una poppa, il quale, quando fa la ruota, ſlarga, e creſce più di un palma. A mezzo il petto gli naſce un fiocco di peli, groſſo come un dito, li quali peli ſono nè più, nè manco che quelli della coda di un cavallo, di color neri, e lunghi più di un palma. La carne di queſti pavoni è molto buona, e ſenza comparazione migliore e più tenera, che quella de' pavoni di Spagna.—It is impoſſible that Oviedo ſhould have written in this manner, had theſe fowls been ſo well known in Europe as Barrington thinks they were.

but that they were carried alſo to New Caſtille, and to the Weſt-India iſlands. The other fowls likewiſe which he deſcribes we have without doubt procured from America, ſuch for example as the *crax alector* *. Lopez de Gomara, whoſe book was printed in 1553, makes uſe of the name *gallopavo*; and ſays that the animal reſembles in ſhape the peacock and the domeſtic cock; and that of all the fowls in New Spain its fleſh is the moſt delicious †. In the year 1584 wild turkeys were found in Virginia ‡. René de Laudonniere found them on his landing in North America in 1564 ||. Fernandez alſo reckons them among the birds of Mexico; and takes notice of the difference between thoſe that were wild and thoſe which had been tamed §. Pedro de Cieſa ſaw

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* The peacock pheaſant of Guiana. *Bancroft.* Quiriſſai or Curaſſao. *Brown.* The creſted curaſſow. *Latham.* TRANS.

† La mejor ave para carne, que ay en la Nueva Eſpana ſon los Gallipavos. Quiſe los liamar aſſi por quanto tienen mucho de pavon, y mucho de gallo. Tiene grandas barvas, o paperas, que ſe muda de muchas colores. *Hiſt. de Mexico*, p. 343.

‡ Hakluyt, vol. iii. p. 274.

|| Pennant quotes alſo De Bry, but that author I never conſulted.

§ Huexolot gallus eſt Indicus, quem gallipavonem quidam vocant, noruntque omnes. Reperiuntur alii ſylveſtres, duplo domeſticis majores; duriore et inſuaviori alimonia, cætera ſimiles, qui interdum ſagittis, interdum vero tormentorum bellicorum vi ſolent interimi. Sunt et feminæ in ſupradicto genere cihuatotolin

ſaw them on the iſthmus of Darien*, and Dampier in Yucatan †. Beſides the teſtimony of many other later travellers which have been already quoted by Buffon, and which I ſhall not here repeat, the accounts of Kalm and Smyth in particular deſerve to be noticed. The former, who viſited Pennſylvania in 1784, ſays, “ The wild

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lin vocatæ, quæ maribus ſunt viliores, etſi gratiſſimo atque ſalubri alimento, cedente tamen ei, quod ſumitur a noſtratibus, ob humiditatem et pinguedinem quandam nimiam, et nauſeam moventem aliquibus delicatioris palati. *Hiſtoria animalium Novæ Hiſpaniæ*, which forms an appendix to his *Theſaur. Rerum medicar. Novæ Hiſpaniæ.* Barrington remarks that Fernandez would not have ſaid *quem norunt omnes*, had theſe animals been firſt made known from America: for Mexico was diſcovered in 1519, and Fernandez appears to have written about 1576. This reaſon, however, appears to me of little weight; eſpecially as it is certain that theſe fowls, like many other productions which excited univerſal curioſity, were ſoon every where common. Beſides, it is not certain that theſe words were really written by Fernandez.

* An Engliſh tranſlation of Cieſa's Voyage may be found in Stevens's New Collection of voyages and travels.

† Vol. ii. part ii. p. 65, 85, 114. Leri ſeems alſo to have found them in Braſil, for Laet, in his *Novus orbis*, Lugd. Bat. 1633, fol. p. 557, ſpeaking of Braſil, ſays: Lerius ſcribit, duo genera exquiſitarum avium hic reperiri, quibus nomen eſt mouton, pavonum magnitudine, pluma nigra et leucopeata; itemque maximam gallinarum, quas vocant Indicas, multitudinem, quas Barbari vocant arignaouſau, ſicuti noſtrates vocant arignaumiri.—As the deſcription, however, is not clear, and as the diligent Marggraf does not mention it among the animals of Braſil, this information appears to be very uncertain.

"turkeys run about here in the woods. Their "wildneſs excepted, they are in nothing different "from ours, but in being generally a little larger, "and in having redder fleſh, which is, however, "ſuperior in taſte. When any one finds their "eggs in the woods, and places them under a tame "hen to be hatched, the young, for the moſt part, "become tame alſo; but when they grow up they "make their eſcape. On this account people cut "their wings before they are a year old. Theſe "wild turkeys, when tamed, are much more miſ"chievous than thoſe tame by nature." Smyth aſſures us that wild turkeys are ſo abundant in the uncultivated country behind Virginia, and the ſouthern provinces, that they may be found in flocks of more than five thouſand †.

Theſe teſtimonies, in my opinion, are ſufficiently ſtrong and numerous to convince any naturaliſt that America is the native country of theſe fowls; but their weight will be ſtill increaſed if we add the accounts given us when and how they were gradually diſperſed throughout other countries. Had they been brought from Aſia or Africa ſome centuries ago, they muſt have been long common in Italy, and muſt have been carried

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* Kalms Reiſe, ii. p. 352.

† A Tour in the United States of America, by J. F. D. Smyth. London 1784, 2 vol. 8vo.

thence over all Europe. We, however, do not find that they were known in that country before the diſcovery of America. It is certain that there were none of them there at the time when Peter de Creſcentio wrote; that is to ſay, in the thirteenth century [*]; elſe he would not have omitted to mention them where he deſcribes the method of rearing all domeſtic fowls, and even peacocks and partridges. The earlieſt account of them in Italy is contained in an ordinance iſſued by the magiſtrates of Venice, in 1557, for repreſſing luxury, and in which thoſe tables at which they were to be allowed are particulariſed [†]. About the year 1570 Bartolomeo Scappi, cook to pope Pius V, gave in his book on cookery ſeveral receipts for dreſſing theſe expenſive and much-eſteemed fowls [‡]. That they were ſcarce at this period appears from its being remarked that the firſt turkeys brought to Bologna were ſome which had been given as a preſent to the family of Buonocompagni, from which Gregory XII, who at that time filled the papal chair, was deſcended [*].

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[*] Creſcentio lived about the year 1280. Italian and German manuſcripts of his book, which I have often quoted, may be found in old libraries. In that of the cathedral at Mentz there is a German one of the year 1464; and a Latin one, in folio, of 1469.

[†] This ordinance may be found in *Lettere di Antonio Zanon*; in Venezia 1763, 8vo. tom. i. p. 34. E parimenti non ſi poſſono in detti conviti metter in tavola pernici e galli, che chiamiamo d'India.

[‡] Opera di M. Bartolomeo Scappi, cuoco ſecreto di Papa Pio V. in Venetia 1570, 4to. lib. v. cap. 36, p. 346: Per fare paſtici di pavoni noſtrali, galli d'India et altri volatici. Cap. 37: Per fare paſticcio di pollancha d'India.—The copy in the library of our univerſity contains eighteen copper-plates, which repreſent different kitchen utenſils, and various operations of cookery.

That theſe fowls were not known in England in the beginning of the ſixteenth century, is very probable; as they are not mentioned in the particular deſcription of a grand entertainment given by archbiſhop Nevil [†]; nor in the regulations made by Henry VIII reſpecting his houſehold, in which all fowls uſed in the royal kitchen are named [‡]. They were, however, introduced into that country about the above period; ſome ſay in the year

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Among the former is a ſmoke-jack: *molinella a fumo.* Theſe plates are well coloured, and the gilding, above all, is well executed. I am inclined to think that turkeys, at this period, were very little reared by farmers; for I do not find any mention of them in *Trattato dell' agricoltura, di M. Affrico Clemente, Padovano,* in Venetia 1572, 12mo; though the author treats of all other domeſtic birds.

[*] This is related by Zanon; but he does not give his authority.

[†] It is certain that the name does not occur in the Liſt of archbiſhop Nevil's feaſt, nor is it mentioned in the Earl of Northumberland's Houſehold-book, ſo late as the year 1512. *Latham's General ſynopſis of birds,* vol. ii. part 2, p. 66.

[‡] This order, which is worthy of notice, may be found in *Archæologia,* or *Miſcellaneous tracts relating to antiquity,* vol. iii. p. 157.

1524; others, in 1530; and ſome, in 1532 *. We know, at any rate, that young turkeys were ſerved up at a great banquet in 1555 †; and about 1585 they were commonly reckoned among the number of delicate diſhes ‡.

According to the account of ſome writers, turkeys muſt have been known much earlier in France: but on ſtrict examination no proofs of this can be found. The earlieſt period aſſigned for their introduction into that country is given by Beguillet ||, who confidently aſſerts that they were

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* Anderſon, Geſchichte des handels, iii. p. 518, and iv. p. 131, 189. *Hakluyt*, ii p. 165, gives the year 1532; and in Barnaby Googe's Art of huſbandry, the firſt edition, printed in 1614, as well as in ſeveral German books, the year 1530 is mentioned.

† Origines Juridiciales, by W. Dugdale. In the Savoy 1671. fol. p. 135.

‡ Pennant quotes the following rhyme from *Tuſſer's Five hundred points of huſbandry*:

Beefe, mutton and porke, ſhred pies of the beſt,
Pig, veale, gooſe and capon and turkie well dreſt;
Cheeſe, apples and nuts, jolie carols to heare,
As then in the countrie, is counted good cheare.

Theſe lines he places in the year 1585, in which the book was printed for the ſecond time; but as there was an edition in 1557, which is mentioned in Haller's *Biblioth. botan.* i. p. 319, a queſtion ariſes whether they are to be found there alſo. In the new edition of 1744, 8vo. which I have now before me, they are entirely omitted.

|| Deſcription du duché de Bourgogne, par MM. Courtépée et Beguillet,

were brought to Dijon under the reign of Philip the Bold, about the year 1385. Had this French author quoted his authority, we might have diſcovered what gave riſe to his miſtake; but as he has not, one cannot help ſuſpecting that the whole account is a fiction of his own. De la Mare alſo is in an error when he relates that the firſt turkeys in France were thoſe which Jaques Cœur, the well-known treaſurer to Charles VII, brought with him from the Levant, and kept on his eſtate in Gatinois, after he had received the king's permiſſion to return to the kingdom. This Cœur, however, who was baniſhed in 1450, never returned, but died in the iſland of Chio in the year 1456*. Equally falſe is the account given by Bouche in his Hiſtory of Provence, that René, or Renatus, king of Naples and duke of Anjou, firſt brought turkeys into the kingdom, and reared them in

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Beguillet, Dijon 1775, 8vo. vol. i. p. 193, and in *Deſcription générale et particuliere de la France.* Paris 1781, fol. In the *Deſcription of Burgundy*, p. 196, the following paſſage occurs:—C'eſt ſous le regne de Philippe le Hardi, que les gelines d'Inde furent apportées d'Artois à Dijon en 1385; ce qui montre la fauſſeté de la tradition, qui en attribue l'apport à l'Amiral Chabot au ſeizième ſiécle. Cent ans avant Chabot, Jaques Cœur en avoit tranſporté de Turquie en ſon chateau de Beaumont en Gatinois, et Americ Veſpuce en Portugal.—What impudence to make ſuch an aſſertion without any proof!

* See the works which give a particular account of this James Cœur, and which have been quoted by Mr. Meuſel in *Allgemeine Welt-hiſtorie*, xxxvii. p. 615.

abundance at Roſſet [*]. This author gives as his authority the oral tradition of the neighbourhood, which certainly cannot be put in competition with teſtimony of a more authentic nature. Another Bouche [†], who a few years ago wrote alſo a Hiſtory of Provence, and who has collected many things that do honour to Renatus, makes no mention of this ſervice, though he could not be ignorant of what had been before related by his nameſake. Had theſe fowls been known ſo early as the time of that monarch, who died in 1480, it is impoſſible that they could have been ſo ſcarce in France as they really were above a hundred years after. The aſſertion, often repeated, but never indeed proved, that they were firſt brought to France by Philip de Chabot, admiral under Francis I, is much more probable. Chabot died in 1543; and what Scaliger ſays, that in 1540 ſome turkeys were ſtill remaining in France, may be conſidered as alluding to the above circumſtance.

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[*] Il ſe plaiſoit auſſi fort à l'agriculture, comme à l'occupation la plus innocente. Il fut le premier, à ce qu'on écrit, qui introduiſit en France les oeillets de Provence, les roſes de Provins, et des muſquées, des paons blancs, des perdrix rouges, des connils blancs, noirs et rouges, et y rendit auſſi fort familiers les cocqs d'Inde, dont il faiſoit grand amas en Provence, et les faiſoit nourrir au lieu de la galiniere près de Roſſet, et ſelon la tradition du voiſinage. *La Chorographie ou Deſcription de Provence, et l'Hiſtoire chronologique du meſme pays*, par Honoré Bouche. A Aix 1664, 2 vol. fol. ii. p. 479.

[†] Eſſai ſur l'hiſtoire de Provence. A Marſeille 1785, 2 vol. 4to.

This much however is certain, that Gyllius, who died in 1555, gave ſoon after the firſt ſcientific deſcription of them, which has been inſerted both by Geſner and Aldrovandus in their works on ornithology. The ſame year the firſt figure of them was publiſhed by Bellon. About the ſame time they were deſcribed alſo by La Bruyere-Champier, who expreſsly remarks that they had a few years before been brought to France from the Indian iſlands diſcovered by the Portugueſe and the Spaniards *. How then could Barrington aſſert that this Frenchman meant the Eaſt and not the Weſt Indies! They muſt, however, have been a long time ſcarce in France; for, in the year 1566,

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* Venerunt in Gallias annos abhinc paucos aves quædam externæ, quas gallinas Indicas appellant; credo, quoniam ex Inſulis Indiæ nuper a Luſitanis Hiſpaniſque patefactæ primum invectæ fuerunt in orbem noſtrum, quæ pavones fere magnitudine æquant; feminæ pennas non habent variegatas, pariunt ova anſerinis amplitudine paria, candida, quæ eſui ſunt. Mares variis coloribus diſtinguuntur, feminis ampliores, qui criſtas erectas, ut gallinacei noſtri, minime gerunt, ſed carnoſum quidpiam rubrum, quod etiam ſub mento inſtar paleariorum dependet, longitudine inſigni, in quo, illis excandeſcentibus et turbatis, miros varioſque colores eſt ſpectare. Vix tamen cœlum noſtrum patiuntur et difficillime educantur. Voraciores ſunt, ideoque copioſo indigent cibario. Segnitiem domini non ferunt, ſed maxime infantes pulli, qui haud temere perveniunt ad adoleſcentiam, niſi ſedula et aſſidua impendatur opera. Omnino alites ſunt. *De re cibaria*, lib. xv. cap. 73, p. 632. This work was firſt publiſhed by the author in 1560, but it was written thirty years before. Turkeys, therefore, at any rate, muſt have been in France in 1630.

when Charles IX paſſed through Amiens, the magiſtrates of that place did not diſdain to ſend him, among other preſents, twelve turkeys [*]. This information ſeems to agree with the account often quoted, that the firſt turkeys were ſerved up, as a great rarity, at the wedding dinner of that monarch in the year 1570 [†]; but it ſeems the breed of theſe fowls was not very common under Charles IX; for they are not named in the ordinances of 1563 and 1567, in which all other fowls are mentioned [‡]. In the year 1603, Henry IV cauſed higglers to be puniſhed who carried away turkeys from the country villages without paying for them, under a pretence that they were for the uſe of the Queen [‖]. I ſhall here alſo remark, that I can no where find that the Jeſuits are entitled to the merit of having introduced theſe fowls into France [§].

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[*] Hiſtoire de la vie privée des Français, par Le Grand d'Auſſy, i. p. 292.

[†] Andersons Geſchichte des handels, iv. p. 131. Keyſlers Reiſen, ii. p. 413.

[‡] De la Mare.

[‖] This is related by Le Grand, from the Journal of L'Etoile.

[§] On lit, dans l'Année litteraire, que Boileau, encore enfant, jouant dans une cour, tomba. Dans ſa chute, ſa jaquette ſe retrouſſe; un dindon lui donne pluſieurs coups de bec ſur une partie très-délicate. Boileau en fut toute ſa vie incommodé; et de-là, peut-être, cette ſévérité de mœurs, - - - ſa ſatyre contre les femmes. - - - Peut-être ſon antipathie contre les dindons occaſionna-

As theſe American fowls muſt have been carried to Germany through other lands, we cannot expect to find them in that country at an earlier period. Geſner, who publiſhed his Ornithology in 1555, ſeems not even to have ſeen them [*]. We are, however, aſſured by ſeveral authors, ſuch as B. Hereſbach [†], Colerus [‡] and others, that turkeys were brought to Germany ſo early as 1530; and in the ſame year carried to Bohemia and Sileſia [||]. Reſpecting the northern countries, I know only, on the authority of Pontoppidan, that they had been in Denmark two hundred years before his time [§].

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occaſionna-t-elle l'averſion ſecrette qu'il eut toujours pour les Jeſuites, qui les ont apportés en France. *De l'Eſprit (par Helvetius).* Amſterdam 1759, 12mo. i. p. 288.

[*] I conclude ſo from the following paſſage, p. 465: Gallopavum *aiunt* vocem quandam edere gallinaceæ non diſſimilem neſcio quid crocitando; et in frigidis ægre ali. Minimum ex eis fructum eſſe, ſumptus in educando alendoque, et curæ multum requiri. In cibo lautiſſimos haberi, et principum menſis dignos.

[†] Indicarum, ut vocant, avium recens apod nos uſus et educatio. Nam ante annum triceſimum ſupra ſeſquimilleſimum apud nos non ſunt viſæ, neque veteribus arbitror notas. *De re ruſtica.* Spiræ Nemet. 1595, 8vo. lib. iv. p. 640.

[‡] Hausbuch, vierter theil. Wittenberg, 1611. 4to. p. 499.

[||] Oekonomiſche nachrichten der Schleſiſchen geſelſchaft, 1773, p. 306. *Schwenkfeld, Teriotroph. Sileſiæ.* For the feſtival of the univerſity of Wittenberg, in 1602, fifteen Indian or Turkey fowls were purchaſed at the rate of a florin each. They were in part dreſſed with lemon-ſauce. See *Wittenbergiſches Wochenblatt*, 1788. p. 258, 267.

[§] Naturhiſtor. von Dannemark. Kopenhag. 1765, 4to. p. 172.

As theſe fowls are found at preſent both in Aſia and Africa, it may be worth while to enquire at what period they were carried thither, eſpecially as theſe quarters of the world have been by ſome conſidered as their native countries. In China there are no other turkeys than thoſe which have been introduced from other parts, as we are expreſsly aſſured by Du Halde, though he erroneouſly adds that they were quite common in the Eaſt Indies *. They were carried to Perſia by the Armenians and other trading people, and to Batavia by the Dutch †. In the time of Chardin they were ſo ſcarce in Perſia that they were kept in the Emperor's menagerie ‡. In the kingdom of Congo, on the

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* Hiſt. génér. des voyages, vi. p. 487.

† Bell's Travels, i. p. 128.

‡ "Turkeys *(poulets d'Inde)* are there foreign and ſcarce birds. The Armenians, about thirty years ago, carried from Conſtantinople to Iſpahan a great number of them, which they preſented to the king as a rarity; but it is ſaid that the Perſians, not knowing the method of breeding them, gave in return the care of them to theſe people, and aſſigned a different houſe for each. The Armenians, however, finding them troubleſome and expenſive, ſuffered them almoſt all to periſh. I ſaw ſome which were reared in the territory of Iſpahan, four leagues from the city, by the Armenian peaſants; but they were not numerous. Some imagine that theſe birds were brought from the Eaſt-Indies; but this is ſo far from being the caſe, that there are none of them in that part of the world. They muſt have come from the Weſt Indies, although they are called *cocqs d'Inde*, becauſe, being larger than common fowls, they

the Gold Coaſt, and at Senegal, there are none but thoſe belonging to the European factories. According to Father de Bourzes there are none of them in the kingdom of Madura; and we are told by Dampier that this is the caſe in the iſland of Mindanao. Proſper Alpinus alſo gives the ſame account in regard to Nubia and Egypt; and Gemelli Carreri ſays there is none of them in the Philippines; though I agree with Buffon in laying very little ſtreſs upon the Travels known under that name, which we have reaſon to ſuppoſe not genuine *.

It is worthy of remark, that Cavendiſh found a great number of turkeys in the iſland of St. Helena ſo early as the year 1588; and Barrington miſapplies this circumſtance to prove that theſe fowls did not come from America. It is, however, very doubtful whether Cavendiſh really meant our turkeys, as he ſays, *Guiney cocks, which we call turkeys* †; for the firſt name belongs to what we at preſent call pintados; and we are under an uncertainty which kind we ought to underſtand. But even allowing that they were turkeys, is it improbable that they ſhould be on an iſland which

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they reſemble in that the Indian fowls, which are of much greater ſize than the common fowls of other countries." *Voyages de Chardin*, iv. p. 84.

* The proofs may be ſeen in Buffon.

† Hakluyt, ii. p. 825.

had often been viſited by the Portugueſe? The account of De la Croix is of as little weight; for he ſays that in the woods of Madagaſcar there are many *coqs d'Inde* *. De la Croix publiſhed his book in 1688, at which time there were in South America wild horſes and wild cattle. Does this, therefore, invalidate the certainty of theſe animals being carried thither from Europe?

I intended to have critically examined thoſe grounds upon which Barrington endeavours to prove that turkeys were originally brought from Africa; but on reading over his eſſay once more, I find the greater part of his arguments are ſufficiently refuted by what I have proved from the moſt authentic teſtimony; and nothing now remains but to add a few obſervations. Barrington conſiders it improbable that theſe fowls ſhould be ſo ſoon ſpread all over Europe, as Cortez firſt viſited Mexico in 1519, ſubdued the capital in 1521, and returned to Spain in 1527. To me, however, it does not appear incredible; for I could prove by ſeveral inſtances, that the curioſity excited by the moſt remarkable American productions ſoon became general. Thoſe, for example, who take the trouble to inquire into the hiſtory of maize or Turkiſh corn will make the ſame remark; though it is a truth fully eſtabliſhed that we procured that grain from America. How ſoon did tobacco become common! In the year 1599 the ſeeds were brought to Portugal; and in the beginning of the ſixteenth century it began to be cultivated in the Eaſt Indies. When Barrington aſſerts that theſe fowls were carried to America by the Europeans, in the ſame manner as horſes and cattle, this argument may be turned againſt himſelf; for he muſt doubtleſs find it equally improbable that they ſhould ſo ſoon become common, numerous and wild, in the New World, as they muſt have been according to the authorities above quoted.

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* Relation univerſelle d'Afrique. Lyon 1688, iv. p. 426.

As many fat turkeys were purchaſed yearly in Languedoc and ſent to Spain in the time of cardinal Perron *, it is thence concluded that theſe fowls were not firſt brought to France through the latter. Perron died in 1620. At that period turkeys were very common; and whoever is acquainted with the induſtry of the Spaniards will not find it ſtrange that the French ſhould begin earlier to make the rearing of theſe animals an employment. How falſely ſhould we reaſon, were we to ſay that it is impoſſible the Engliſh and French ſhould procure the beſt wool from Spain, becauſe the

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* Le coq d'Inde eſt un oiſeau qui a peuplé merveilleuſement ; de Languedoc ils en mênent en Eſpagne, comme de moutons. *Perroniana*, p. 67.

the Spaniards purchaſe the beſt cloth from the French and the Engliſh !

One proof by which Barrington endeavours to ſhew that turkeys were eſteemed ſo early as the fifteenth century is very ſingular. He quotes from Leland's Itinerary that *capons of Greaſe* were ſerved up at an entertainment, under Edward IV, in 1467. The paſſage alluded to I cannot find ; but an author muſt be very ſelf-ſufficient and bold indeed, to convert *capons of Greaſe* into *capons of Greece*, and to pretend that theſe were turkeys [*].

What, however, moſt excites my ſurpriſe is, that the name of theſe fowls even ſhould be aſſumed by this writer as a ground for his aſſertion. Had they, ſays he, been brought from America, they would have been called American or Weſt-Indian fowls ; as if new objects had names given to them always with reflection. Names are often beſtowed upon objects before it is known what they are or whence they are procured. Ray, Minſhew [†], and others have been induced by the name turkey-fowls to conſider Turkey as their original country; but whoever is verſed in reſearches of this kind knows that new foreign articles are often called Turkiſh, Italian, or Spaniſh. Is Turkey the original country of maize? or is Italy the original country of theſe birds, becauſe they have been ſometimes called Italian fowls? Even allowing that turkeys had acquired their German name (*kalekuter*) from Calicut, this, at any rate, would prove nothing farther than that it was once falſely believed that theſe animals were brought from Calicut to Europe: but I ſuſpect that the appellation *kalekuter*, as well as the names *truthenne*, *putjen*, and *puten*, were formed from their cry. Chardin offers a conjecture which is not altogether to be neglected. That traveller thinks that theſe fowls were at firſt conſidered as a ſpecies of the domeſtic fowl, and that they were called Indian, becauſe the largeſt domeſtic fowls are produced in that country*.

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[*] The Itinerary of John Leland the antiquarian. In nine volumes. The ſecond edition. Oxford 1744, 8vo. vol. vi. p. 5.

[†] Minſheu's Ductor in linguas (The Guide into tongues), 1617, fol. and *Minſchæi Emendatio Ductoris in linguas*, 1625, fol. p. 501, 719: Avis ita dicta, quod ex Africa, et, ut nonnulli volunt alii, ex India vel Arabia ad nos allata ſit. *Calekuttiſch hun*, i. e. gallina Calecuttenſis.

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* See Chardin ut ſupra.

BUTTER.

MILK, the moſt natural and the commoneſt food of man, is a mixture of three component parts, whey, butter, and cheeſe. The caſeous part is viſcous and ſlimy; the butter is the fat, oily and inflammable part, and both, properly ſpeaking, are not perfectly diſſolved in the ſerum or whey, but rather only diffuſed through it like an emulſion, ſo that theſe component parts may be ſeparated by reſt alone, without any artificial preparation. When milk is in a ſtate of reſt, the oily part riſes to the ſurface, and forms what is called cream. When the milk has curdled, which will ſoon be the caſe, the caſeous parts ſeparate themſelves from the whey; and this ſeparation may be occaſioned alſo by the addition of ſome mixture, through means of which the produce is liable to many variations. The caſeous part when ſqueezed and mixed with ſalt, and perhaps herbs, and when it has been moulded into a certain form and dried, is uſed under the name of cheeſe, which will always be better, the greater the butyraceous part is that has been left in it. The cream ſcummed off, and by proper agitation in a churn or other veſſel ſeparated from the whey and caſeous parts, becomes our uſual butter.

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This ſubſtance, though commonly uſed at preſent in the greater part of Europe, was not known, or known very imperfectly, to the ancients [*]. The ancient tranſlators of the Hebrew writers [†] ſeem however to have thought that they found it mentioned in ſcripture [‡]: but thoſe beſt acquainted with biblical criticiſm, unanimouſly agree that the word *chamea* ſignifies milk or cream, or ſour thick milk, and at any rate does not mean butter *. The word plainly alludes to ſomething liquid, as it appears that *chamea* was uſed for waſhing the feet, that it was drunk, and that it had the power of intoxicating; and we know that mare's milk, when ſour, will produce the like effect. We can imagine ſtreams of milk, but not ſtreams of butter. This error has been occaſioned by the ſeventy interpreters, who tranſlate the Hebrew word by the word *boutyron*. Theſe tranſlators, who lived two hundred years after Hippocrates, and who reſided in Egypt, might, as Mr. Michaelis remarks, have been acquainted with butter, or have heard of it; but it is highly probale that they meant cream, and not our uſual butter. Thoſe who judge from the common tranſlation, would naturally conclude that the paſſage in Proverbs, chap. xxx, deſcribes the preparation of butter by ſhaking or beating; but the original words ſignify ſqueezing or preſſing, *preſſio, frictio mulgentis educit lac;* ſo that milking and not making butter is alluded to.

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[*] The works with which I am acquainted that treat on this ſubject, are the following: *Martini Schoockii Tractatus de butyro: acceſſit ejuſdem Diatriba de averſatione caſei.* Groningæ 1664, 12mo. *H. Conringii De habitus corporum Germanicorum antiqui et novi cauſſis.* Helmſtadii 1666, 4to. and the new edition, *cum annotationibus J. Phil. Burggravii, fil.* Francofurt. ad Moenum 1727, 8vo, in which however no new obſervations occur reſpecting the ſubject. *Voſſii Etymologicon*, art. *Butyrum*. *Traité de la police, par De la Mare*, lib. v. 7. ii. p. 799. *Tob. Waltheri Diſſert. de butyro.* Altorfii 1743. *Conr. Geſneri Libellus de lacte et operibus lactariis, cum epiſtola ad Avienum de montium admiratione*, 1543, 8vo. This ſmall treatiſe I have hitherto ſought for in vain, and I ſhould conſider myſelf under very great obligations to any perſon who could procure it for me, or lend it to me.

[†] Bochart, Hierozoicon, ii. 45. p. 473.

[‡] Geneſis, chap. xviii. ver. 8: And he took butter and milk, and the calf which he had dreſſed, and ſet before them. *Deuteron.* chap. xxxii. v. 14: Butter of kine and milk of ſheep. *Judges*, chap. v. ver. 25: He aſked water, and ſhe gave him milk; ſhe brought forth butter in a lordly diſh. 2 *Samuel*, chap. xvii. ver. 29: And honey and butter and ſheep. *Job*, chap. xx. ver. 17: He ſhall not ſee the rivers, the floods, the brooks of honey and butter. *Ibid.* chap. xxix. ver. 6: When I waſhed my ſteps with butter, and the rock poured me out rivers of oil. *Proverbs*, chap. xxx. ver. 33: Surely the churning of milk bringeth forth butter. *Iſaiah*, chap. vii. ver. 15: Butter and honey ſhall he eat,

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eat, that he may know to refuſe the evil and chooſe the good. *Ib.* ver. 22: And it ſhall come to paſs, for the abundance of milk that they ſhall give, that he ſhall eat butter; for butter and honey ſhall every one eat that is left in the land.

* Michaelis Supplementorum ad Lexica Hebraica pars i. p. 807; and his *Moſaiſches Recht*, § 291 and 295.

The oldeſt mention of butter, though it is indeed dubious and obſcure, is in the account given of the Scythians by Herodotus *. “ Theſe people,” ſays he, “ pour the milk of their mares into wooden veſſels, cauſe it to be violently ſtirred or ſhaken by their blind ſlaves, and ſeparate the part that ariſes to the ſurface, as they conſider it more valuable and more delicious than that which is collected below it.” The author here certainly ſpeaks of the richeſt part of the milk being ſeparated from the reſt by ſhaking; and it appears that we have every reaſon to ſuppoſe that he alludes to butter, eſpecially as Hippocrates, who was almoſt cotemporary, mentions the ſame thing, but in a much clearer manner †. “ The Scythians,” ſays the

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* Herodot. iv. 2. p. 281: Poſtquam emulxere lac, in cava vaſa lignea diffundunt; et compungentes ad illa vaſa cœcos lac agitant (δονεουσι το γαλα), cujus quod ſummum eſt, delibatur, pretioſiuſque habetur; vilius autem quod ſubſidit.—That δονεειν ſignifies to ſhake or beat, there can be no doubt. Theocritus uſes the ſame word in ſpeaking of a tree ſtrongly agitated by the wind. It is uſed alſo to expreſs the agitation of the ſea during a ſtorm; and in *Geopon.* xx. 46. p. 1270, where the preparation of that ſauce called *garum* is mentioned, it is ſaid that it muſt be placed in the ſun, and frequently ſhaken (πυκινως δονουμενα). Hippocrates expreſſes the ſame thing by σειειν and ταρασσειν.

† De Morbis, lib. iv. edit. 1595, fol. v. p. 67: Iſtud vero ſimiliter ſe habet, ut id quod ex lacte equino Scythæ conficiunt. Lac enim in vaſa lignea cava affuſum agitant, conturbatum vero ſpumeſcit ac ſeparatur, et pingue quidem, quod butyrum vocant (ὃ βουτυρον καλεουσι), cum leve ſit, in ſummo ſeponitur, grave vero et

the latter, “ pour the milk of their mares into wooden veſſels, and ſhake it violently; this cauſes it to foam, and the fat part, which is light, riſing to the ſurface, becomes what is called butter. The heavy and thick part, which is below, being kneaded and properly prepared, is, after it has been dried, known by the name of *hippace*. The whey or ſerum remains in the middle.” This author, in my opinion, ſpeaks here very diſtinctly of butter, cheeſe, and whey. It is probable that the Scythians may have haſtened the ſeparation of the caſeous part from the whey by warming the milk, or by the addition of ſome ſubſtance proper for that purpoſe. Theſe paſſages therefore contain the firſt mention of butter, which occurs ſeveral times in Hippocrates, and which he preſcribes externally as a medicine *; but he gives

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et craſſum ſubſidet, quod etiam ſeparantes ſiccant. Quod cum concretum et ſiccatum fuerit Hippacen vocant. Lactis vero ſerum medium locum habet. Ὁ δε ὀῤῥος του γαλακτος εν μεσῳ εϛιν. Ἱππακη is cheeſe made of mares’-milk, as Hippocrates himſelf expreſsly tells us in another paſſage; for in his treatiſe *De aere, locis et aquis*, ſect. iii. p. 74, he ſays, the Scythians drink mares’-milk and eat cheeſe made of it: πινουσι γαλα ἱππων και ἱππακην τρωγουσιν, τουτο δ’ εϛι τυρος ἱππων. More proofs may be found in *Foeſii Œconomia Hippocratis*. Francof. 1588, fol. p. 285. Heſychius explains ὀῤῥος in the following manner: το ὑδατωδες και αφιϛαμενον του γαλακτος. See *Foeſii Œcon. Hip*. p. 463.

* De natura mulierum, ſect. v. p. 137. De morbis mulier. 2. ſect. v. p. 191, 235, and in ſeveral other places. Voſſius therefore, in his *Etymolog*. p. 84, ſays erroneouſly, that this word was firſt uſed by Dioſcorides.

it another term *(pikerion)*, which ſeems to have been in uſe among the Greeks earlier than the former, and to have been afterwards neglected *. That this word ſignified butter, and was no longer employed in the time of Galen, appears from his tranſlating it, in his explanation of the obſolete expreſſions of Hippocrates, by the word *boútyron* †. It was even before that period explained in the ſame manner by Erotian, in his dictionary of the words uſed by that Greek phyſician; and he remarks, from an ancient writer, that the Phrygians called butter *pikerion*, and that the Greeks ſeemed to have borrowed the word from theſe people ‡. It however occurs very ſeldom, and is to be found neither in Heſychius, Suidas, nor Pollux ‖.

The poet Anaxandrides, who lived ſoon after Hippocrates, deſcribing the wedding of Iphicrates, who married the daughter of Cotys, king of Thrace,

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[*] De morbis mulier. lib. ii. p. m. 209: Κλυζειν τῳ συν τῳ πικεριῳ: and a little after, p. 210: μεταχλυσαι τῳ πικεριῳ - - - - επιχριειν τα ελκεα πικεριον.

[†] Edition of Baſle 1538, fol. v. p. 715: πικεριον βουτυρον.

[‡] Erotianus in his Lexicon, of which ſome account is given by Fabricius in *Biblioth. Græca*, iv. p. 571: πικεριῳ, βουτυρῳ. ὡς και Αριϛοφανης εν τοις ὑπομνημασι φησιν, ὅτι Θοας ὁ Ιτακησιος ἱϛορει παρα Φριξι πικεριον το καλεισθαι βουτυρον. Si quidem Ariſtophanes in Commentariis refert, Thoantem Itaceſium narrare: βουτυρον vocari πικεριον a Phrygibus.

[‖] Phavorinus, however, in his *Dictionarium magnum*, Venetiis 1712, fol. p. 603, ſays: πικεριον, το βουτυρον, παρα τῳ Ἱπποκρατει.

Thrace, and the Thracian entertainment given on that occaſion, ſays, that the Thracians ate butter[*], which the Greeks at that time conſidered as a wonderful kind of food[†].

It is very remarkable, that the word butter does not occur in Ariſtotle, and that he even ſcarcely alludes to that ſubſtance, though we find in his works ſome very proper information reſpecting milk and cheeſe, which ſeems to imply careful obſervation. At firſt he gives milk only two component parts, the watery and the caſeous; and he remarks afterwards, for the firſt time, in a paſſage where one little expects it, that in milk there is alſo a fat ſubſtance, which, under certain circumſtances, is like oil[‡].

In

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[*] Athen. Deipnoſ. iv. p. 131: δειπνειν δ'ανδρας βουτυρον.

[†] Dalechamp ſays, very improperly, that βουκολοις ought to be read inſtead of βουτυρον. *Caſauboni Animadverſ. in Athen.* lib. iv. c. 3. p. 248. Reſpecting Anaxandrides ſee *Fabricii Biblioth. Græca*, i. 666, 740.

[‡] Hiſtoria animal. iii. 20. p. 384: παν δε γαλα εχει ιχωρα ὑδατωδη, ὃ καλειται ορρος, και σωματωδες, ὃ καλειται τυρος. Omne lac habet ſuccum aquoſum, qui dicitur ſerum, et alterum corpulentum, qui vocatur caſeus. P. 388: ὑπαρχει δ'εν τῳ γαλακτι λιπαροτης, ἣ και εν τοις πεπηγοσι γινεται ελαιωδης. Ineſt in lacte pinguedo, quæ in concreto oleoſa fit. This is the tranſlation of Scaliger; but by Gaza the latter part of the paſſage is tranſlated as follows: quæ etiam concreto oleum prope trahit. It appears to me doubtful what εν τοις πεπηγοσι properly means. The

comparison

In Strabo there are three paſſages that refer to this ſubject, but from which little information can be obtained. This author ſays, that the Luſitanians uſed butter inſtead of oil; he mentions the ſame circumſtance reſpecting the Ethiopians *; and he relates in another place, that elephants, when wounded, drank this ſubſtance in order to make the darts fall from their bodies †. I am much aſtoniſhed, I confeſs, to find that the ancient Ethiopians were acquainted with butter, though it is confirmed by Ludolfus ‡. It ought to be remarked alſo, that, according to Ariſtotle, the elephants, to cure themſelves, did not drink butter,

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compariſon of oil occurs alſo in Dioſcorides and Pliny. Ariſtotle, in all probability, intended to ſay that the fat part of milk was obſerved under an oily appearance in cheeſe made of ſweet milk from which the cream had not been ſeparated; and that indeed is perfectly agreeable to truth.

[*] Lib. iii. p. 233: αντ' ελαιου δε βουτυρῳ χρωνται. Lib. xvii. p. 1176: εϛι δε ελαιον, και βουτυρον και ϛεαρ; pro oleo habent butyrum et adipem.

[†] Lib. xv. p. 1031: Τραυμασι δε ποτον μεν βουτυρον, εξαγει γαρ τα σιδηρα. Vulneribus butyrum potum auxiliatur; ferrum enim ejicit.

[‡] Butyrum et caſeum optimum, ubi temperatus eſt aer, conficere poſſunt Habeſſini; quo calidiores regiones alias carent, quia ob æſtum difficulter congelatur: verum idoneis vaſis deſtituti, non niſi magno labore cogunt, quippe in labro patulo lac tamdiu quatiunt, donec in butyrum coaguletur. *Hiſtor. Æthiop.* lib. iv. 4, 13.

but oil *. In this he is followed by Pliny †; and Ælian ſays, that for the above purpoſe theſe animals uſed either the bloom of the olive-tree, or oil itſelf ‡; but Arrian, who lived a hundred years after Strabo, and who has related every thing reſpecting the diſeaſes of the elephant and their cures, in the ſame order as that author, has omitted this circumſtance altogether ||. Is the paſſage of Strabo, therefore, genuine? Ælian however ſays in another part of his book, that the Indians anointed the wounds of their elephants with butter §.

We are told by Plutarch, that a Spartan lady paid a viſit to Berenice, the wife of Dijotarus, and that the one ſmelled ſo much of ointment, and the other of butter, that neither of them could endure the other ¶. Was it cuſtomary therefore, at that

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[*] Elephanti non omnes oleum bibunt; at qui bibunt, ſi quid in corpus ab hoſtibus adactum eſt, olei potu ejici prædicant. *Hiſtor. animal.* viii. 31. p. 977.

[†] Olei potu tela, quæ corpori eorum inhæreant, decidere invenio. *Hiſt. Nat.* viii. 10. p. 440.

[‡] Elephantus oleæ florem (ελαιας πασας ανθος, η ελαιον αυτο) vel oleum ipſum guſtans deſixa tela expellit. *Hiſt. animal.* ii. 18.

[||] Indica. Edit. Blancardi. Amſtelod. 1668, 8vo. p. 537.

[§] Ειτα μεντοι διαχριουσι τῳ βουτυρῳ αυτα; deinde butyro ungunt. *Lib.* xiii. cap. 7.

[¶] Adverſus Colotem, p. 1109. Το μυρον και το βουτυρον.

period, for people to perfume themſelves with butter?

Of much more importance are the remarks made by Dioſcorides and Galen on this ſubject. The former ſays, that good butter was prepared from the fatteſt milk, ſuch as that of ſheep or goats, by ſhaking it in a veſſel till the fat was ſeparated. To this butter he aſcribes the ſame effects, when uſed externally, as thoſe produced by our butter at preſent. He adds alſo, and he is the firſt writer who makes the obſervation, that freſh butter might be melted and poured over pulſe and vegetables inſtead of oil, and that it might be employed in paſtry in the room of other fat ſubſtances. A kind of ſoot likewiſe was at that time prepared from butter for external applications, which was uſed in curing inflammation of the eyes and other diſorders. For this purpoſe the butter was put into a lamp, and, when conſumed, the lamp was again filled till the deſired quantity of ſoot was collected in a veſſel placed over it*.

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* Mater. med. ii. 81. p. 107: Laudabile paratur butyrum e lacte pinguiſſimo, quale ovillum eſt; fit et ex caprino, agitato in vaſis lacte, donec pingue ſeparetur. - - - Recens etiam opſoniis pro oleo admiſcetur, uti et placentis adipis vice. μιγνυται και προσοψημασιν αντι ελαιου το νεαρον, και εν τοις πεμμασιν αντι στεατος. - - - Colligitur e butyro fuligo hunc in modum. In lu-

Galen, who diſtinguiſhes and confirms in a more accurate manner the healing virtues of butter, expreſsly remarks that cow's-milk produces the fatteſt butter; that butter made from ſheep's or goat's-milk is leſs rich; and that aſs's-milk yields the pooreſt. He expreſſes his aſtoniſhment, therefore, that Dioſcorides ſhould ſay that butter was made from the milk of ſheep and goats. He aſſures us that he had ſeen it made from cow's-milk, and that he believes it had thence acquired its name *. "Butter," ſays he, "may be very properly employed for ointments; and when leather is beſmeared with it, the ſame purpoſe is anſwered as when it is rubbed over with oil. In cold countries, which do not produce oil, butter is

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cernam infuſum butyrum accendito. - - - εις λυχνον εγχεας το βουτυρον ἆψον - - - ubi primum abſumptum fuerit butyrum, aliud ſubinde affundito. ὅταν δε αναλωθη το πρωτον βουτυρον, αλλο επιχει.

* Butyrus aut butyrum, utcunque nominare voles, ſive maſculino, ſive neutro genere, fit quidem, ut dictum eſt, ex eo quod in lacte pinguiſſimum eſt. Miror autem quo pacto Dioſcorides ex ovillo et caprino confici referat. Ego namque ex bubulo hoc medicamentum fieri novi, ac proinde nuncupatum eſſe butyrum exiſtimo. Βουτυρος η βουτυρον, ὅπως αν εθελης αῤῥενικως τε και ουδετερως ονομαζειν αυτην, γινεται μεν ουν εκ του λιπαρωτατου κατα το γαλα καθοτι προειρηται. Θαυμαζω δε ὅπως ὁ Διοσκοριδης εκ προβατειου φησιν αυτον και αιγειου την γενεσιν εχειν. Εγω γαρ εκ του βοειου το φαρμακον τουτο γιγνομενον οιδα, και δια τουτο νομιζω και βουτυρον καλεισθαι. De Simplic. med. facultat. lib. x. p. 151. Edit. Baſil. ii. p. 134.

uſed in the baths; and that it is a real fat may be readily perceived by its catching fire when poured over burning coals *." What has been here ſaid is ſufficient to ſhew that butter muſt have been very little known to, or uſed by, the Greeks and the Romans in the time of Galen †, that is, at the end of the ſecond century.

The Roman writers who give an account of the ancient Germans, all relate, that they lived principally on milk; but they diſagree in one thing, becauſe many of them tell us that they uſed cheeſe, while others affirm that they were not even acquainted with the method of preparing it ‡. Pliny

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* Pinguem ſuccum habet lac boum plurimum; ideoque butyrum, quod vocant, ex eo conficiunt, quod guſtu ſolo viſuque quantum in ſe pinguedinis habeat facile cognoſcas. Quod ſi partem aliquam corporis eo inunxeris ac fricueris, cernes cutem pinguem non aliter ac ſi oleo fricuiſſes; præterea, ſi mortui animalis corium aridum eo inunxeris, eundem cernes effectum. Quinimmo homines in pleriſque frigidis regionibus, in quibus oleo carent, in balneo butyro utuntur. Cernitur præterea, ſi ignitis carbonibus ipſum infundas, non aliter ac pinguedo flammam excitare. - - - φαινεται δε καν επ'ανθρακων διαπυρων εκχεεις αυτο φλογα ποιουν, ὥσπερ ἡ πιμελη. De aliment. facultat. iii. cap. 15. p. 54. Edit. Baſil. iv. p. 340.

† Galen wrote at Rome.

‡ Maximam partem lacte atque pecore vivunt. *Cæſar de bello Gall.* iv. i. Major pars victus eorum lacte et caſeo et carne conſiſtit. Lib. vi. cap. 22. - - *Strabo*, lib. iv. ſpeaking of the Britons, ſays: Moribus partim ſimiles Celtis, partim ſimpliciores et magis barbari, adeo ut nonnulli, quamvis lacte abundent, caſeum tamen non conficiant propter imperitiam.

on

on the other hand ſays, that they did not make cheeſe but butter, which they uſed as a moſt pleaſant kind of food. He aſcribes to them alſo the invention of it; for it is highly probable, that under the expreſſion "barbarous nations" he meant the people of Germany; and his deſcription of butter appears to me ſo clear, that I do not ſee how it can be doubted [*]. He very juſtly remarks, that, in order to make butter in cold weather, the milk ought to be warmed, but that in ſummer this precaution is not neceſſary. The veſſel employed for making it ſeems to have had a great likeneſs to thoſe uſed at preſent; we are told at leaſt that it was covered, and that in the lid there were holes [†].

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[*] Mirum barbaras gentes, quæ lacte vivunt, ignorare aut ſpernere tot ſæculis caſei dotem, denſantes id alioqui in acorem jucundum, et pingue butyrum; ſpuma id eſt lactis, concretiorque quam quod ſerum vocatur. Non omittendum in eo olei vim eſſe, et barbaros omnes, infanteſque noſtros, ita ungi. *Plin.* lib. xi. c. 41. p. 637.

[†] E lacte fit et butyrum, barbararum gentium lautiſſimus cibus, et qui divites a plebe diſcernat. Plurimum e bubulo, et inde nomen; pinguiſſimum ex ovibus. Fit et ex caprino, ſed hieme, calefacto lacte; æſtate, expreſſo tantum jactatu in longis vaſis, anguſto foramine ſpiritum accipientibus ſub ipſo ore, alias præligato. Additur paululum aquæ, ut aceſcat. Quod eſt maxime coactum, in ſummo fluitat; id exemptum, addito ſale, oxygala appellant. Reliquum decoquunt in ollis. Ibi quod ſupernatat, butyrum eſt, oleoſum natura. Quo magis virus reſipit, hoc præſtantius indicatur. Pluribus compoſitionibus miſcetur inveteratum. Natura ejus adſtringere, mollire, replere, purgare. Oxygala

What he ſays however reſpecting *oxygala* is attended with difficulties; and I am fully perſuaded that his words are corrupted, though I find no variations marked in manuſcripts by which this conjecture can be ſupported. Having made an attempt, by tranſpoſing the words, to diſcover the real ſenſe, I found that I had placed them in the ſame order as that in which they had been before arranged by Dithmar, who, in his annotations on Tacitus, quotes them in the ſame manner as I would read them, and with ſo much confidence that he does not even hint that they were ever read otherwiſe. Had we both been critics, this ſimilarity might have given our conjecture perhaps more authority; but Dithmar alſo was a profeſſor of the economical ſciences *.

Oxygala was evidently a kind of cheeſe, the preparation

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gala fit et alio modo, acido lacte addito in recens quod velis inaceſcere, utiliſſimum ſtomacho. *Plin.* lib. xxviii. cap. 9. p. 465.

* In my opinion the paſſage ought to be arranged as follows: —præligato. Quod eſt maximum coactum, in ſummo fluitat. Id exemptum, addito ſale, butyrum eſt, oleoſum natura. Quod reliquum eſt decoquunt in ollis. Additur paululum aquæ (aceti?), ut aceſcat. Id quod ſupernatat, oxygala appellant. Quo magis virus reſipit, hoc præſtantius indicatur. Pluribus compoſitionibus miſcetur inveteratum. Natura ejus adſtringere, mollire, replere, purgare.—Dithmar's emendation may be found in *Taciti Libel. de moribus German.* Francofurti ad Viadrum 1766, 8vo. p. 140.

paration of which has been beſt deſcribed by Columella[*]. In order to make it, ſweet milk was commonly rendered ſour, and the ſerum was always ſeparated from it. Of this proceſs Pliny ſpeaks likewiſe; but he firſt mentions under the above name a kind of cheeſe formed from the caſeous parts which remained behind in the butter-milk, and which were ſeparated from it by acids and boiling, and were mixed and prepared in various ways. It muſt in general have been ſouriſh; for, according to the account of Galen[†], it affected the teeth, though he mentions alſo another kind of cheeſe, under the name of *caſeus oxygalactium*[‡], which was perfectly mild. In the *Geoponica*[||], directions are given how this cheeſe may be kept freſh for a long time. If my reading be adopted, the medicinal effects ſpoken of by Pliny, are not to be aſcribed to the butter, but to the ſour cheeſe[§]; and phyſicians undoubtedly will be much readier to allow them to the latter than to the former. Whether Tacitus by *lac concretum*, which he ſays was the moſt common food of the

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[*] Lib. xii. 8, p. 786.

[†] De aliment. facultat. iii. cap. 16. p. 55.

[‡] Ibid. cap. 17. p. 57.

[||] Lib. xviii. 12, p. 1188.

[§] See what Mercurialis, p. 38, ſays on this ſubject. In my opinion it is not neceſſary to read, as he propoſes, *digerere* inſtead of *adſtringere*.

Germans, meant cheeſe or butter I cannot examine, as we have no grounds to enable us to determine this queſtion, reſpecting which nothing more can be known *.

I have now laid before the reader, in chronological order, every thing that I found in the works of the ancients reſpecting butter; and it is certain, from what has been ſaid, that it is not a Grecian, and much leſs a Roman, invention; but that the Greeks were made acquainted with it by the Scythians, the Thracians, and the Phrygians, and the Romans by the people of Germany †. It appears alſo,

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* De Moribus Germanorum, cap. 23. Conring takes particular notice of this paſſage; by other commentators it has been neglected.

† On this account ſome conjecture, and not without probability, that the name alſo βουτυρος or βουτυρον is not originally Greek, but that it may have been introduced into Greece from ſome foreign country, along with the thing which it expreſſes. Conring, for example, is of opinion that it is of Scythian extraction. The Grecian and Roman authors, however, make it to be a Greek word, compounded of βους, an ox or cow, and τυρος cheeſe, as we learn from the paſſages of Galen and Pliny already quoted. Cheeſe was known to them much earlier than butter; and it is therefore poſſible, that at firſt they may have conſidered the latter as a kind of cheeſe, as it appears that τυρος once ſignified any coagulated ſubſtance. The firſt ſyllable of the word, indeed, one ſhould hardly expect, as the Greeks uſed the milk of ſheep and goats much earlier than cow's-milk; and for this reaſon Schook conjectures that the firſt ſyllable was added, as

alſo, that when they had learned the art of making it, they employed it only as an ointment in their baths, and particularly in medicine. Beſides the proofs already quoted, a paſſage of Columella[*] deſerves alſo to be remarked, becauſe that author, and not Pliny, as Voſſius thinks, is the firſt Latin writer who makes uſe of the word *butyrum*. Pliny

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as uſual among the Greeks, to magnify the object, or to expreſs a ſuperior kind of cheeſe. *Varro, De re ruſtica*, ii. 5. p. 274, ſays: Novi majeſtatem boum, et ab his dici pleraque magna, ut βουσικον, βουπαιδα, βουλιμον, βουπιν; uvam quoque bumammam; and we find in Heſychius: βουπαις, νιος μεγας. βουπεινα, μεγας λιμος. βουφαγος, πολυφαγος. [Vigerus, in his treatiſe *De præcipuis Græcæ dictionis idiotiſmis*, Lugd. Bat. 1680, p. 54, ſays alſo: ἱππος et βους in compoſitione το μεγα ſignificant; ειωθε γαρ ἡ προσθηκη των τοιουπων ζωων το μεγεθος του ὑποκειμενου δηλουν, διον βουλιμος, &c. TRANS.]. But this ſuppoſes that the Greeks preferred butter to cheeſe; whereas they always conſidered the former as of leſs importance, and leſs proper for uſe. The ſame word being ſtill retained in moſt languages determines nothing; eſpecially as the Swedes uſe the word *ſmor*, which is totally different, and which was the oldeſt German name, and that moſt uſed in the ninth century; and Lipſius, in an old dictionary of that period, found the word *kuoſmer* butyrum, the firſt ſyllable of which is certainly the word *kuh*, a cow. See *Lipſii Epiſt. ad Belgas*, cent. iii. 44. edition of 1639, 8vo. p. 915. See alſo *Olai Wormii Litteratura Runica*, cap. 27. Theſe etymological reſearches, which muſt always be uncertain, I ſhall not carry farther; but only remark that, according to Heſychius, butter, in Cyprus, where I did not expect it, was called ελφος, which word may alſo be foreign. See *Martini Lexic. philol.* art. *Butyrum*, who derives ελφος from *albus*.

[†] Lib. vi. 12, p. 582.

recommends it mixed with honey to be rubbed over children's gums in order to eaſe the pain of teething, and alſo for ulcers in the mouth [*]. The Romans in general ſeem to have uſed butter for anointing the bodies of their children to render them pliable [†]; and we are told that the ancient Burgundians beſmeared their hair with it [‡]. A paſſage of Clemens of Alexandria, in which he expreſsly ſays, that ſome burned it in their lamps inſtead of oil, is likewiſe worthy of attention [||]. It is however certain on the other hand, that it was uſed neither by the Greeks nor the Romans in cookery or the preparation of food, nor was it brought upon their tables by way of deſſert, as is every where cuſtomary at preſent. We never find it mentioned by Galen and others as a food, though they have ſpoken of it as applicable to other purpoſes. No notice is taken of it by Apicius; nor is there any thing ſaid of it in that reſpect by the authors who treat on agriculture, though they have given us very particular information concerning milk, cheeſe, and oil. This, as has been remarked by other writers, may be eaſily accounted for, by the ancients having entirely accuſtomed themſelves to the uſe of good oil; and in the like manner, butter at preſent is very little employed in Italy, Spain, Portugal, and the ſouthern parts of France, where it is ſold in the apothecaries' ſhops for medicinal purpoſes *. It is certain beſides, that in warm countries it is difficult to preſerve it for any length of time.

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[*] Infantibus nihil butyro utilius, per ſe et cum melle; privatim et in dentitione, et ad gingivas et ad oris hulcera. Lib. xxviii. cap. 19. p. 486.

[†] A paſſage of Tertullian *adverſus Jud.* alludes to this practice: Aliud eſt, ſi penes vos infantes in prælium erumpunt, credo ad ſolem uncti prius, dehinc pannis armati, et butyro ſtipendiati. The ſame words are repeated, *Adverſus Marcion.* iii. 13, only the paſſage begins as follows: Penes Ponticos Barbariæ gentis infantes in prælium - - -

[‡] Quod Burgundio cantat eſculentus,
Infundens acido comam butyro.
Sidonius Apollinaris, carm. 12.

[||] Αλλ' οἱ πολλοι δε και τῳλιπαρῳτου γαλακτος, ὃ δε βουτυρον καλουσι, καταχρωνται εις λυχνον. Sed multi adipe lactis, quod butyrum vocant, utuntur ad lucernam. *Clemens Alexand. Pædag.* i. p. 107.

To conclude, I ſhall offer one remark, which, in my opinion, is entirely new. It appears to me, by the information which I have here collected from the ancients, that at the period when theſe

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* When Leodius accompanied the elector palatine, Frederick II, in his travels through Spain, he was deſirous of purchaſing in that country ſeveral articles neceſſary for their journey. After much enquiry concerning butter, he was directed to an apothecary's-ſhop, where the people were much aſtoniſhed at the largeneſs of the quantity he aſked for, and ſhewed him a little, entirely rancid, which was kept in a bladder for external uſe. *H. Th. Leodii Vita et res geſtæ Frederici Palatini.* Francoſ. 1665, 4to. lib. vi.

authors wrote, people were not acquainted with the art of making butter ſo clean and ſo firm as that which we uſe on our tables. On the contrary, I am fully perſuaded that it was rather in an oily ſtate, and almoſt liquid. They all ſpeak of butter as of ſomething fluid. The moderns cut, knead, and ſpread butter; but the ancients poured it out as one pours out oil. Galen tells us, that, to make ſoot of butter, the butter muſt be poured into a lamp. Had the ancients uſed in their lamps hard or ſolid butter, as our miners uſe tallow in the lamps that ſupply them with light under ground, they would not have made choice of the expreſſion *to pour out.* We are told that the elephants drank butter; and liquid butter muſt have been very familiar to the Greek tranſlators of the Sacred Scriptures, when they could mention it as flowing in ſtreams. Hecatæus, quoted by Athenæus, calls the butter with which the Pæonians anointed themſelves, oil of milk *. Caſaubon † obſerves on this paſſage, that the author makes uſe of theſe words, becauſe butter was then employed inſtead of oil, and ſpoken of in the like manner, as was the caſe with ſugar, which was at firſt conſidered to be a kind of honey, becauſe it was equally ſweet and could be applied to the ſame purpoſes. Hippocrates, on the like grounds, calls ſwine's ſeam, ſwine's-oil *. This explanation I ſhould readily adopt, did not ſuch expreſſions reſpecting butter, as one can apply only to fluid bodies, occur every where without exception. In warm countries, indeed, butter may be always in a liquid ſtate; but I am of opinion that the ancients in general did not know by means of kneading, waſhing and ſalting, to render their butter ſo firm and clean as we have it at preſent. On this account it could not be long kept or tranſported, and the uſe of it muſt have been very much limited.

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* Lib. x. p. 447: αλειφονται δε φησιν ελαιῳ απο γαλακτος.

† Animadverſiones in Athen. x. cap. 14. p. 741.

I ſhall remark in the laſt place, that butter appears to have been extremely ſcarce in Norway during the ages of paganiſm; for we find mention made by hiſtorians of a preſent of butter which was ſo large that a man could not carry it, and which was conſidered as a very reſpectable gift †.

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* What Hippocrates calls ελαιον ὑος Erotian explains by το ὕειον ϛεαρ.

† Suhm's Forſog til en afhandling om de Danſkes og Norſkes handel og ſeylads den hedenſke tid. This eſſay may be found in the eighth vol. of the *Tranſactions of the Copenhagen Society*, where a reference is made, p. 53, reſpecting the above-mentioned circumſtance, to *Torfæi Hiſtor. Norveg.* pars i. 1. ſect. iii. cap. 2. p. 319.

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